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PRE-HISTORIC TIMES.

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THE TUMULI OF ODIN THOR & FREYA AT UPSALA

,

PRE-HISTORIC TIMES,

AS ILLUSTRATED BY

ANCIENT REMAINS,

AND THE

MANNERS AND CUSTOMS OF MODERN SAVAGES.

BY

SIR JOHN LUBBOCK, BART., M.P.

VICE-PRESIDENT OF THE ROYAL SOCIETY, VICE-PRESIDENT OF THE BRITISH ASSOCIATION; PRESIDENT OF THE ANTHROPOLOGICAL INSTITUTE; AND FELLOW OF THE LINNÆAN, GEOLOGICAL, AND OTHER LEARNED SOCIETIES.

THIRD EDITION.

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PREFACE TO THE FIRST EDITION.

IN this work I present to the public some essays on Pre-historic Archæology, part of which have appeared in the Natural History Review, viz. that on—

The Danish Shell-mounds, in October, 1861.

The Swiss Lake-dwellings, in January, 1862.

The Flint Implements of the Drift, in July, 1862.

North American Archæology, in January, 1863.

Cave-men, in July, 1864.

Messrs. Williams and Norgate suggested to me to republish these articles in a separate form: and I was further encouraged to do so by the fact that most of them had re-appeared, either in France or America. The conductors of the Annales des Sciences Naturelles did me the honour to translate those on the Danish Shell-mounds and the Swiss Lake-dwellings. The latter also appeared in Silliman's Journal; and the article on American Archæology, with the

exception of the last paragraph, was reprinted in the Smithsonian Report, for 1862 *.

At first I only contemplated reprinting the papers as they stood; but having, at the request of the managers, delivered at the Royal Institution a short course of lectures on the Antiquity of Man, it was thought desirable to introduce the substance of these, so as to give the work a more complete character.

My object has been to elucidate, as far as possible, the principles of pre-historic archæology; laying special stress upon the indications which it affords of the condition of man in primeval times. The tumuli, or burial-mounds, the peat-bogs of this and other countries, the Kjökkenmöddings or shell-mounds of Denmark, the Lake-habitations of Switzerland, the bone-caves and the river-drift gravels, are here our principal sources of information.

In order to qualify myself, as far as possible, for the task which I have undertaken, I have visited not only our three great museums in London, Dublin, and Edinburgh, but also many on the Continent; as, for instance, those at Copenhagen, Stockholm, Lund, Flensburg, Aarhuus, Lausanne, Basle, Berne, Zurich,

* The article on Cave-men was also translated in the Annales des Sciences Naturelles, fifth ser. vol. ii., and that on North American Archæology in the Revue Archéologique for 1865.

Yverdon, Paris, Abbeville, etc., besides many private collections of great interest, of which I may particularly specify those of M. Boucher de Perthes, Messrs. Christy, Evans, Bateman, Forel, Schwab, Troyon, Gilliéron, Uhlmann, Desor, and lastly, the one recently made by MM. Christy and Lartet in the bone-caves of the Dordogne.

Sometimes alone, and sometimes in company with Messrs. Prestwich and Evans, I have made numerous visits to the valley of the Somme, and have examined almost every gravel-pit and section from Amiens down to the sea. In 1861, with Mr. Busk, and again in 1863, I went to Denmark, in order to have the advantage of seeing the Kjökkenmöddings themselves. Under the guidance of Professor Steenstrup, I visited several of the most celebrated shell-mounds, particularly those at Havelse, Bilidt, Meilgaard, and Fannerup. I also made myself familiar with so much of the Danish language as was necessary to enable me to read the various reports drawn up by the Kjökkenmödding committee, consisting of Professors Steenstrup, Worsaae, and Forchhammer. Last year I went to the north of Scotland, to examine some similar shell-mounds discovered by Dr. Gordon, of Birnie, on the shores of the Moray Firth, which appear, however,

to belong to a much later period than those of Denmark.

In 1862 M. Morlot very kindly devoted himself to me for nearly a month, during which time we not only visited the principal museums of Switzerland, but also several of the Lake-habitations themselves, and particularly those at Morges, Thonon, Wauwyl, Moosseedorf, and the Pont de Thiele. In addition to many minor excursions, I had, finally, last spring, the advantage of spending some time with Mr. Christy among the celebrated bone-caves of the Dordogne. Thus, by carefully examining the objects themselves and the localities in which they have been found, I have endeavoured to obtain a more vivid and correct impression of the facts than books, or even museums, alone could have given.

To the more strictly archæological part of the work I have added some chapters on the Manners and Customs of Modern Savages, confining myself to those tribes which are still, or were, when first visited by travellers, ignorant of the use of metal, and which have been described by competent and trustworthy observers. This account, incomplete as it is, will be found, I think, to throw some light on the remains of savage life in ages long gone by.

Fully satisfied that religion and science cannot in reality be at variance, I have striven in the present publication to follow out the rule laid down by the Bishop of London, in his excellent lecture delivered last year at Edinburgh. The man of science, says Dr. Tait, ought to go on, "honestly, patiently, diffidently, observing and storing up his observations, and carrying his reasonings unflinchingly to their legitimate conclusions, convinced that it would be treason to the majesty at once of science and of religion if he sought to help either by swerving ever so little from the straight rule of truth *."

Ethnology, in fact, is passing at present through a phase from which other Sciences have safely emerged; and the new views with reference to the Antiquity of Man, though still looked upon with distrust and apprehension, will, I doubt not, in a few years, be regarded with as little disquietude as are now those discoveries in astronomy and geology, which at one time excited even greater opposition.

I have great pleasure in expressing my gratitude to many archæological friends for the liberal manner in which their museums have been thrown open to me,

* Lecture on Science and Revelation delivered at Edinburgh. See the *Times*, November 7th, 1864.

and for much valuable assistance in other ways. My thanks are due to Professor Steenstrup for many of the figures by which the work is illustrated. Others, through the kindness of Sir W. R. Wilde, Mr. Franks, and Dr. Thurnam, have been placed at my disposal by the Society of Antiquaries, and the Royal Irish Academy. To Professor Steenstrup, Dr. Keller, M. Morlot, and Professor Rütimeyer, I am indebted for much information on the subject of their respective investigations. Finally, Mr. Busk, Mr. Evans, and Professor Tyndall have had the great kindness to read many of my proofs, and I am indebted to them for various valuable suggestions.

CHISELHURST,
February, 1865.

PREFACE TO THE SECOND EDITION.

IN preparing a New Edition of PRE-HISTORIC TIMES, I have endeavoured, as far as possible, to avoid unduly increasing the size of the book; and although the present work will be found to contain a great number of new facts, some of the chapters being indeed almost re-written, still it is only increased in size to the extent of one hundred pages. Nearly half of these are occupied by the addition of more than seventy new figures, which will tend to diminish, rather than increase, the time occupied by its perusal.

This course has compelled me to omit all reference to many researches of much merit and interest, while in other cases I have been obliged to treat the labour of years in a few short sentences. The true force of the evidence in support of archæological conclusions is thus materially weakened, by being deprived of its cumulative character, but I have endeavoured in many cases to meet the objection by the introduction of statistical tables.

Since the first edition was published, I have visited the principal German and Italian museums, and have been in correspondence with the most active archæologists both in Europe and also across the Atlantic.

I cannot attempt here to express in any suitable manner my gratitude for the assistance which I have received. Every museum which I have visited has been thrown open to me with the greatest liberality; and every archæologist whom I have consulted has given me the readiest and fullest information.

No one can be more sensible than I am of the many shortcomings of this work. Those, however, who perceive them most clearly, will, I am sure, be disposed to judge them leniently, because they will best be able to appreciate the difficulty of keeping pace with a Science which has so many and such enthusiastic votaries; the results of whose earnest labour are to be found scattered through a number of periodicals, published in many different countries and in various tongues.

HIGH ELMS, DOWN, KENT,
March, 1869.

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    Troyon's Habitations Lacustres, pl. xi, fig. 28.
50. Bronze bracelet from Cortaillod, on the lake of Neufchatel, one-third of the actual size.
    Troyon, *l. c.* pl. xi., fig. 18.
51-54. Bronze hair-pins from the Swiss lakes, one half of the actual size.
    Keller, *l. c.* Zweiter Bericht, pl. 3.
55. Bronze awl from the Swiss lakes, actual size.
    Keller, *l. c.* Zweiter Bericht, pl. 3.
56-60. Various small objects of bronze from the Swiss lakes.
    Keller, *l. c.* Zweiter Bericht, pl. 3.
61. Bronze celt, one-half nat. size. Showing the line of junction of the two halves of the mould in which it was cast.
    Found at Aylesford, Kent; and presented to me by G. W. Dasent, Esq.
62. Bronze brooch, Mecklenburgh, three-tenths nat. size. Showing the manner in which it has been mended.
    Lisch. Alterthümer, H. vii. pl. 4, fig. 2.
63. Bronze celt. Showing the air-vents bent over.
64. Gold torque, consisting of a simple flat strip or band of gold, loosely twisted, and having expanded extremities which loop into one another. It measures 5½ inches across, and was found near Clonmacnoise, in Ireland.
    Cat. of Royal Irish Academy, p. 74.
65. Gold fibula, one-half of the actual size. The hoop is very slender, the cups deep and conical.
    Cat. of Royal Irish Academy, p. 56.
66. Smooth massive cylindrical gold ring, with ornamented ends, one-half of the actual size.
    Cat. of Royal Irish Academy, p. 52.

67. Gold fibula, one-third of the actual size. The external surfaces of the cups are decorated with circular indentations surrounding a central indented spost. There is also an elegant pattern where the handle joins the cups. It is $8\frac{3}{8}$ inches long, and weighs 33 ounces, being the heaviest now known to exist.
    Cat. of Royal Irish Academy, p. 60.

67*. Iron ornament, Africa.

68. Inscribed celt. Museum Kircherianum, Rome. One-half of the actual size.
    Rap. Sugli. Stud. e Sulle Scop. Paleo. nel bacino delle Campagna Romana. Rossi.

69. Woollen cap, one-third of the actual size. Found with the bronze sword (fig. 27) in a Danish tumulus.
    Afb. af. Danske Oldsager og Mindesmeeker. Madsen, H. 5.

70. Another woollen cap, one-third of the actual size. Found with the preceding.

71. A small comb, one-third of the actual size. Found with the preceding.

72. A woollen cape, one-third of the actual size. Found with the preceding.

73. A woollen shirt, one-third of the actual size. Found with the preceding.

74. A woolled shawl, one-third of the actual size. Found with the preceding.

75. A pair of leggings, one-third of the actual size. Found with the preceding.

76. Hut urn. Albano.

77. Urn apparently representing a lake-dwelling. In the Munich collection.
    Lisch. Die Alterthümer Unserer Heid. Vorzeit, H. x. T. 3.

78. Group of beehive houses, Scotland.
    Proc. Soc. antiq. Scot., vol. i. part xii.

79. The Burgh of Moussa. Shetlands.

80. Staigue Fort, in the county of Kerry.
    From a model in the collection of the Royal Irish Academy.

81. Flint core or nucleus, from which flakes have been struck, Jutland. One-half of the actual size.
    In my own collection.

82-84. Three views of a flint flake from the Kjökkenmödding at Fannerup, in Jutland, one-half of the actual size. *a* represents the bulb of percussion, which is also shown by the shading in fig. 84.
    In my own collection.

85. Arrow-shaped flake from Ireland. It is worked up at the butt end, as if intended for a handle.
    Catalogue of Royal Irish Academy, p. 72.

86-88. Flakes from a Danish shell-mound, actual size.
    In my own collection.

89. Minute flint flake from Denmark, actual size.
    In my own collection.

90. Sections of flakes. *a* Is that of a simple triangular flake; *b* is that of a large flat flake split off the angle from which the smaller flake *a* had been previously taken. Consequently the section is four-sided.

91. North American two-bladed knife, made of two flakes.
    Reliquiæ Aquitanicæ, p. 43, fig. 16.

92. Australians making flakes.
    Geol. and Nat. His. Repertory. May, 1866.

93. Australian flake, one-half actual size.
In my own collection.

94. Flake from the Cape of Good Hope, actual size.
In my own collection.

95. Head of New Caledonian Javelin, one-half actual size.
In my own collection.

96. New Caledonian Javelin, one-sixth actual size.
In my own collection.

97. Stone celt or hatchet. It is formed of felstone, is 5¾ inches long and 2 broad.
Cat. of Royal Irish Academy, p. 41.

98. Stone celt or hatchet, actual size. Found in the river Shannon. One of the smallest yet found in Ireland.
Cat. of Royal Irish Academy, p. 45.

99. Stone celt with a wooden handle, Monaghan, Ireland.
Cat. of Royal Irish Academy, p. 46.

100. Stone celt with wooden handle, one-third actual size. Concise. From Desor.

101, 102. Danish axe, re-ground. One-half actual size.
From my own collection.

103. Skin-scraper from Bourdeilles in the south of France, actual size.
Found by me.

104. Ditto under side.

105-107. Skin-scraper used by the modern Esquimaux of the Polar basin, within Behring's Straits, actual size. It was fastened into a handle of fossil ivory. In the Christy Museum.

108. Flint axe from the shell-mound at Meilgaard, in Jutland, actual size Upper surface.

109. Ditto, under surface.

110. Ditto, side view.
In my own collection.

111. Modern New Zealand adze, actual size. Upper surface.
In the British Museum.

112. Ditto, under surface.

113. Ditto, side view.
The New Zealand adze is partially polished; this is not the case with the Danish adze, because flint naturally breaks with a smooth surface. The projection *a*, in fig. 110, is accidental, and owing to some flaw in the flint. They generally have the under side as flat as in fig. 113.

114. Hollow chisel from Denmark.
In my own collection.

115. Danish dagger.
In my own collection.

116. Flint dagger, one-half of the actual size. This beautiful specimen was found in a large tumulus with a second imperfect dagger, a rude flint core, an imperfect crescent-shaped knife, one or two flakes, two amber beads, and some bits of pottery. Denmark.
In my own collection.

117. Another form of flint dagger. Also from Denmark.
In my own collection.
118. Oval tool-stone.
Cat. of Royal Irish Academy, p. 94.
119. Triangular flint arrow-head, actual size.
Cat. of Royal Irish Academy, p. 19.
120. Indented flint arrow-head, actual size.
Cat. of Royal Irish Academy, p. 20.
121. Barbed flint arrow-head, actual size.
Cat. of Royal Irish Academy, p. 22.
122. Leaf-shaped flint arrow-head, actual size. Showing the gradual passage into the spear-head.
Cat. of Royal Irish Academy, p. 22.
123. French arrow-head, actual size.
In my own collection.
124. North American arrow-head, actual size.
In my own collection.
125. Fuegian arrow-head, actual size.
From Nilsson's Stone Age.
126. Stone saw in wooden handle. Switzerland, one-half actual size.
After Keller.
127. Bone pin or awl from Scotland, actual size.
128. Bone chisel, actual size. From Wangen on the lake of Constance.
In my own collection.
129. Bone harpoon, actual size.
Afb. af. Danske Old og Minnesmaerker, 5 Heft.
130. Ancient bone harpoon, actual size. Dordogne.
After Christy and Lartet.
131. Bone scraper. North America.
Reliquiæ Aquitanicæ, part 5, p. 43, fig. 26.
132. A tumulus of the Stone Age, at Röddinge in Denmark. It contains two chambers.
Nordiske Oldsager i det Kong. Mus. i Kjöbenhavn, pl. 4.
133. Ground plan of ditto.
134. Stone circle, Denmark.
Nordiske Oldsager i det Knog. Mus. i Kjöbenhavn, pl. 1.
135. Dolmen, Denmark.
136. Stone circle.
Nordiske Oldsager i det Kong. Mus. i Kjöbenhavn, pl. 2.
137. Kit's Coty House, near Maidstone.
After Col. Forbes Leslie. Early Races of Scotland.
138. Carnac, Brittany.
From a drawing by Dr. Hooker, F.R.S.
139. Indian Dolmen.
After Capt. Meadows Taylor.
140. Indian Dolmen. Ditto.
141. Summer and winter dwellings in Kamschatka.
Atlas to Cook's Voyage, pl. 77.
141*. Laplander's Gamme or hut.

142. Kumbecephalic skull from Derbyshire.
After Bateman. Ten Years' Diggings, p. 146.

143. Ground plan of a sepulchral chamber in a large tumulus on the island of Möen.
Ann. for Nordiske Old Kyndighed, 1858, p. 204.

144. Brachycephalic skull from the above tumulus, one-quarter of the natural size.

145. Ditto, side view.
I am indebted for these two drawings to the kindness of my friend Mr. Busk.

146. Interior of the sepulchral chamber in the long barrow near West Kennet, in Wiltshire.
Archæologia, vol. xxxviii. p. 405.

147. Flint scraper from the above tumulus, two-thirds of the actual size.
Archæologia, vol. xxxviii. p. 405.

148. Flint scraper from the above tumulus, two-thirds of the actual size.
Archæologia, vol. xxxviii. p. 405.

149. Flint flake from the above tumulus, two-thirds of the actual size.
Archæologia, vol. xxxviii. p. 405.

150. Flint implement from the above tumulus, two-thirds of the actual size.
Archæologia, vol. xxxviii. p. 405.

151. Fragment of pottery from the above tumulus, two-thirds of the actual size.
Archæologia, vol. xxxviii. p. 405.

152. Fragment of pottery from the above tumulus, actual size.
Archæologia, vol. xxxviii. p. 405.

153-5. Fragments of pottery from the above tumulus, two-thirds of the actual size.
Archæologia, vol. xxxviii. p. 405.

156. Fragment of pottery, actual size.
Archæologia, vol. xxxviii. p. 405.

157. Urn from Flaxdale barrow. The original is 14 inches in height.
Bateman's Ten Years' Diggings in Celtic and Saxon Gravehills, p. 280.

158, 159. Two vases from Arbor Low, in Derbyshire.
Bateman's Ten Years' Diggings in Celtic and Saxon Gravehills, p. 283.

160. Drinking cup from Green Low.
Bateman's Ten Years' Diggings in Celtic and Saxon Gravehills, p. 286.

161. Sculptures on the Lower Rock at Auchnabreach, Argyllshire.
After Sir J. Y. Simpson. Proc. Soc. Ant. Sc., vol. vi. p. 23.

162. Crannoge in Ardakillin Lough, near Stokestown, county of Roscommon. It is constructed of stones and oak piling. The top line shows the former highest water level, the second that of the ordinary winter flood, the third the summer level.

163. Section of the lake-dwelling at Niederwyl.
From Lee's Keller, pl. xvi. fig. 2.

164. Swiss axe of serpentine, actual size. From Wangen on the Lake of Constance.
In my own collection.
165. Spindle whorl, actual size. From Wangen on the Lake of Constance.
In my own collection.
166. Piece of pottery, showing the impressions of the finger-tip, and the marks of the nail, actual size. Lake of Zurich.
168. Piece of tissue, actual size. From Robenhausen.
In my own collection.
169. Portion of the vertebra of a cow.
170. Corresponding ditto of a bison.
171. Bronze pin, actual size.
Found in a shell-mound near Elgin, and now in the museum at that place.
172. Flint awl from Denmark, actual size.
After Worsaae.
173. Lance-head? from Denmark, actual size.
After Worsaae.
174. Lance-head? from Denmark, actual size.
After Worsaae.
175. Lance-head? from Denmark, actual size.
After Worsaae.
176. Rude flint axe from Denmark, actual size.
After Worsaae.
177. Copper arrow or spear head, Cincinnati, one-third actual size.
Whittlesey. Boston Soc. of Nat. His., vol. i. pl. 16, fig. 6.
178. Copper lance-head, Ontarragon, one-third actual size.
Whittlesey. Boston Soc. of Nat. His., vol. i. pl. 16, fig. 4.
179. Molar tooth of *E. antiquus*, one-third actual size.
After Lyell.
180. Molar tooth of the mammoth, one-third actual size.
After Lyell.
181. Flat stone implement of uncertain use, actual size.
From the cave at La Madelaine.
182. Stone implement, resembling in some respects those characteristic of the drift gravels, actual size. From Moustier. In my own collection.
183. Ditto, seen from the side.
184. Ditto, seen from the other side.
185. A cylindrical piece of reindeer horn, on which are engraved two outlines of fishes, one on each side. La Madelaine, Dordogne.
After Lartet and Christy.
186. Piece of the palm of a reindeer's antler, on which is engraved the head and neck of an ibex. Laugerie Basse, Dordogne.
After Lartet and Christy.
187. Group of figures. Dordogne.
After Lartet and Christy.
188. Group of reindeer.
From a photograph presented to me by the Marquis de Vibraye.

189. Poniard of reindeer horn.
From the cave at Laugerie Basse.
190. The Engis skull, seen from above.
191. Ditto, seen from the front.
Huxley's Man's Place in Nature, p. 126.
192. The Neanderthal skull, seen from the side, one-half natural size.
193. Ditto, seen from the front, one-half natural size.
194. Ditto, seen from above, one-half natural size.
Huxley's Man's Place in Nature, p. 139.
The outlines from camera lucida drawings by Mr. Busk; the details from a cast and from Dr. Fuhlrott's photographs. *a* glabella; *b* occipital protuberance; *d* lambdoidal suture.
195. Rude flint implement from the drift gravel at Hoxne, one-half actual size
After Frere. Archæologia, 1800, pl. xv.
196. Ditto, side view.
197. Another specimen.
After Frere. Archæologia, 1800, p. xv.
198. Ditto, side view.
199. Stone implement, Madras.
From a specimen found and presented to me by Mr. Bruce Foot.
200. Another stone implement, Madras.
From a specimen found and presented to me by Mr. Bruce Foot.
201. Section across the valley of the Somme at Abbeville, after Prestwich; the proportion of the length is reduced to one-third.
202. Section at St. Acheul, near Amiens.
a. Brick earth with a few angular flints.
b. Red angular gravel.
c. Marly sand, with land and freshwater shells.
d. Grey subangular gravel, in which the flint implements are found.
e. Coffin.
f. Tomb.
203. Section taken in a pit close to the Joinville station.
b. Red angular gravel, containing a very large sandstone block.
d. Grey subangular gravel.
204. Diagram to illustrate deposit of loëss and gravel.
a' Loëss corresponding to and contemporaneous with the gravel *a*.
b' Loëss „ „ „ „ *b*.
c' Loëss „ „ „ „ *c*.
1. Level of valley at period *a*.
2. Level of valley at period *b*.
3. Level of valley at present.
205. Australian knife.
From a specimen presented to me by A. W. Franks, Esq.
206. Australian club, one-fifth of the actual size.
207. Australian spear and spear caster.
After Eyre.
208. Australian boomerang, one-sixth of the actual size.
209. Tasmanian fire-sticks, one-third actual size.
From specimens presented to me by Mr. Robinson.

210. New Zealand patoo patoo, one-fourth of the actual size.
In my own collection.

211. Stone axe with wooden handle, one-fourth of the actual size.
In my own collection.

212. South Sea axe of ceremony.
In my own collection.

213. South Sea fish-hook, one-half of the actual size.
In my own collection.

214. Esquimaux knife.
In my own collection, from a specimen presented to me by Mr. Flower.

215, 216. Esquimaux knife.
In my own collection.

217. Esquimaux arrow-head, actual size.
In my own collection.

218. Esquimaux spear-head, actual size.
In my own collection.

219. Esquimaux bone-harpoon, one-third of the actual size.
In my own collection.

220. Esquimaux cheek-stud of stone.
In my own collection, presented by Dr. Rae.

221-3. Drawings on Esquimaux bone implements.
Presented to the Ashmolean Museum, by Captain Beechey, 1832.

224. Dacotah fire-drill-bow.
From Schoolcraft's Indian Tribes.

225. Iroquois fire-pump-drill.
From Schoolcraft's Indian Tribes.

226. Fuegian harpoon, one-half of the actual size.
In my own collection.

227. Ogham stone. Found in Kerry.
Cat. of Royal Irish Academy, p. 135.

228. Ogham stone. Found in Kerry.
Cat. of Royal Irish Academy, p. 135.

DESCRIPTION OF THE PLATES.

The three great tumuli at Upsala, popularly supposed to be those of Odin, Thor, and Freya. (*Frontispiece.*)

Diagram of Abury. (*To face page* 119.)

PLATE I. (*To face page* 75.)

Fig. 1. A flint axe from a tumulus, one-third of the actual size.

2. Another form of stone axe, with a hole for a handle, one-third of the actual size.

3. A flint saw, one-half of the actual size.

4. A flint dagger, one-sixth of the actual size.

5. A flint chisel, one-half of the actual size.

6 One of the "cores" from which the flint flakes are splintered, one-half of the actual size.

7. One of the flakes, one-half of the actual size.

8, 9. Rude axes from the Kjökenmödding at Havelse, one-half of the actual size.

10. Flint axe from drift at Moulin Quignon, near Abbeville, one-half of the actual size.

11. Flint axe from Abbeville, showing that the part stained white is parallel to the present surfaces, and that the weathering has taken place since the flint was worked into its present shape; one-half of the actual size.

12. Slingstone from the Kjökkenmödding at Havelse, one-half of the actual size.

PLATE II. (*To face page* 334.)

Sketch of mammoth, on a piece of ivory found at La Madelaine in the Dordogne.

PLATE III. (*To face page* 342.)

A flint implement found near Abbeville, slightly reduced.

In my own collection.

The artist has been so careful to present a faithful image of this specimen, that he has even copied exactly my rough memorandum as to the place and date of its discovery.

PRE-HISTORIC TIMES.

CHAPTER I.

INTRODUCTION.

THE first appearance of Man in Europe dates from a period so remote, that neither history, nor even tradition, can throw any light on his origin, or mode of life. Under these circumstances, some have supposed that the past is hidden from the present by a veil, which time will probably thicken, but never can remove. Thus our prehistoric antiquities have been valued as monuments of ancient skill and perseverance, not regarded as pages of ancient history; recognized as interesting vignettes, not as historical pictures. Some writers have assured us that, in the words of Palgrave, "We must give it up, that speechless past; whether fact or chronology, doctrine or mythology; whether in Europe, Asia, Africa, or America; at Thebes or Palenque, on Lycian shore or Salisbury Plain: lost is lost; gone is gone for ever." Others have taken a more hopeful view, but in attempting to reconstruct the story of the past, they have too often allowed imagination to usurp the place of research, and have written in the spirit of the novelist, rather than in that of the philosopher.

Of late years, however, a new branch of knowledge has

arisen; a new Science has, so to say, been born among us, which deals with times and events far more ancient than any which have yet fallen within the province of the archæologist. The geologist reckons not by days or by years; the whole six thousand years, which were until lately looked on as the sum of the world's existence, are to him but one unit of measurement in the long succession of past ages. Our knowledge of geology is, of course, very incomplete; on some questions we shall no doubt see reason to change our opinion, but on the whole, the conclusions to which it points are as definite as those of zoology, chemistry, or any of the kindred sciences. Nor does there appear to be any reason why those methods of examination which have proved so successful in geology, should not also be used to throw light on the history of man in pre-historic times. Archæology forms, in fact, the link between geology and history. It is true that in the case of other animals we can, from their bones and teeth, form a definite idea of their habits and mode of life, while in the present state of our knowledge the skeleton of a savage could not always be distinguished from that of a philosopher. But on the other hand, while other animals leave only teeth and bones behind them, the men of past ages are to be studied principally by their works; houses for the living, tombs for the dead, fortifications for defence, temples for worship, implements for use, and ornaments for decoration.

From the careful study of the remains which have come down to us, it would appear that Pre-historic Archæology may be divided into four great epochs.

I. That of the Drift; when man shared the possession of Europe with the Mammoth, the Cave bear, the Woolly-haired rhinoceros, and other extinct animals. This we may call the "Palæolithic" period.

II. The later or polished Stone Age; a period characterized by beautiful weapons and instruments made of

flint and other kinds of stone; in which, however, we find no trace of the knowledge of any metal, excepting gold, which seems to have been sometimes used for ornaments. This we may call the "Neolithic" period.

III. The Bronze Age, in which bronze was used for arms and cutting instruments of all kinds.

IV. The Iron Age, in which that metal had superseded bronze for arms, axes, knives, etc.; bronze, however, still being in common use for ornaments, and frequently also for the *handles* of swords and other arms, though never for the blades.

Stone weapons, however, of many kinds were still in use during the Age of Bronze, and even during that of Iron, so that the mere presence of a few stone implements is not in itself sufficient evidence that any given "find" belongs to the Stone Age. In order to prevent misapprehension, it may also be well to state, at once, that, for the present, I only apply this classification to Europe, though, in all probability, it might be extended also to the neighbouring regions of Asia and Africa. As regards other civilized countries, China and Japan for instance, we, as yet, know nothing of their prehistoric archæology. It is evident, also, that some nations, such as the Fuegians, Andamaners, etc., are even now, or were very lately, in an Age of Stone.

It is probable that gold was the metal which first attracted the attention of man; it is found in many rivers, and by its bright colour would certainly attract even the rudest savages, who are known to be very fond of personal decoration. Silver does not appear to have been discovered until long after gold, and was apparently preceded by both copper and tin, as it is rarely, if ever *, found in tumuli of the Bronze Age; but, however this may be, copper seems to have been the metal which first became of real importance to

* Horæ feralos, p. 60.

man: no doubt owing to the fact that its ores are abundant in many countries, and can be smelted without difficulty; and that, while iron is hardly ever found except in the form of ore, copper often occurs in a native condition, and can be beaten at once into shape. Thus, for instance, the North American Indians obtained pure copper from the mines near Lake Superior and elsewhere, and hammered it at once into axes, bracelets, and other objects.

Tin also early attracted notice, probably on account of the great heaviness of its ores. When metals were very scarce, it would naturally sometimes happen that, in order to make up the necessary quantity, some tin would be added to copper, or *vice versâ*. It would then be found that the properties of the alloy were quite different from those of either metal, and a very few experiments would determine the most advantageous proportion, which for axes and other cutting instruments is about nine parts of copper to one of tin. No implements or weapons of tin have yet been found, and those of copper are extremely rare, whence it has been inferred that the art of making bronze was known elsewhere, before the use of either was introduced into Europe. Many of the so-called "copper" axes, etc., contain a small proportion of tin; and the few exceptions indicate probably a mere temporary want, rather than a total ignorance, of this metal.

The ores of iron, though more abundant, are much less striking in appearance than those of copper. Moreover, though they are perhaps more easily reduced, the metal, when obtained, is much less tractable than bronze. This valuable alloy can very easily be cast, and, in fact, all the weapons and implements made of it in olden times were cast in moulds of sand or stone. The art of casting iron, on the other hand, was unknown until a comparatively late period.

In the writings of the early poets, iron is frequently charac-

terized by the epithet *πολύκμητος*, and its adjective, *σιδήρεος*, is used metaphorically to imply the greatest stubbornness.

While, however, these facts tend very much to remove the *à priori* improbability that a compound and comparatively expensive material like bronze should have been in general use before such a common metal as iron, we must, of course, seek elsewhere for evidence of the fact.

Hesiod, who is supposed to have written about 900 B.C., and who is the earliest European author whose works have come down to us, appears to have lived during the transition between the Bronze and Iron Ages. He distinctly states that iron was discovered after copper and tin. Speaking of those who were ancient, even in his day, he says that they used bronze, and not iron.

τοῖς δ'ἦν χάλκεα μὲν τεύχεα. χάλκεοι δέ τε οἶκοι,
χαλκῷ δ' εἰργάζοντο μέλας δ' οὐκ ἔσκε σίδηρος.

His poems, as well as those of Homer, show that nearly three thousand years ago, the value of iron was known and appreciated. It is true that, as we read in Dr. Smith's Dictionary of Greek and Roman Antiquities, bronze "is represented in the Iliad and Odyssey as the common material of arms, instruments, and vessels of various sorts; the latter (iron) is mentioned much more rarely." While, however, the above statement is strictly correct, we must remember that among the Greeks the word iron (*σίδηρος*) was used, even in the time of Homer, as synonymous with a sword, and that steel also appears to have been known to them under the name of *ἀδάμας*, and perhaps also of *κύανος*, as early as the time of Hesiod. We may, therefore, consider that the Trojan war took place during the period of transition from the Bronze to the Iron Age.

In the Pentateuch, excluding Deuteronomy, bronze, or as it is unfortunately translated, brass, is mentioned thirty-eight times, and iron only four times.

Lucretius distinctly mentions the three ages. He says,—

> Arma antiqua, manus, ungues, dentesque fuerunt
> Et lapides, et item sylvarum fragmina rami,
> Posterius ferri vis est, ærisque reperta,
> Sed prior æris erat, quam ferri cognitus usus*.

Coming down to more modern times, Eccard† in 1750, and Goguet in 1758‡, mention the three latter ages in plain terms §; the same idea runs through Borlase's History of Cornwall, and Sir Richard Colt Hoare also expresses the opinion that instruments of iron "denote a much later period" than those of bronze.

To the Northern archæologists, however—especially to Mr. Thomsen, the founder of the Museum at Copenhagen, and to Professor Nilsson—must be ascribed the merit of having raised these suggestions to the rank of a scientific classification.

The date of the introduction of iron into the North of Europe cannot at present be satisfactorily ascertained; nevertheless it is most likely that the use of this metal spread rapidly. Not only does it seem *à priori* probable that such an important discovery would have done so, but it is evident that the same commercial organization which had already carried the tin of Cornwall all over our continent, would equally facilitate the transmission of iron, as soon as that even more useful metal was discovered and rendered available. However this may be, the soldiers of Brennus were provided with iron swords, and when the armies of Rome brought the civilization of the South into contact with that of the North, they found the value of iron already well known to, and in general use among, their new enemies. Nor is there any reason to suppose that arms of bronze were also at that time still in use in the North, for, had

* V. 1282.

† Eccard. De Origine et Moribus Germanorum.

‡ Goguet. De l'Origine des Lois, des Arts et des Sciences. See Ch. iv. and the preface.

§ See Rhind in Arch. Ins. Jour. V. xiii.

this been so, they would certainly have been mentioned by the Roman writers; whereas the description given by Tacitus of the Caledonian weapons shows that in his time the swords used in Scotland were made of iron. Moreover there are several cases in which large quantities of arms belonging to the Roman period have been found together, and in which the arms and implements are all of iron. This argument is in its very nature cumulative, and cannot therefore be fully developed here, but out of many, I will mention a few cases in illustration.

Some years ago, an old battle-field was discovered at Tiefenau, near Berne, and described by M. Jahn. On it were found a great number of objects made of iron; such as fragments of chariots, bits for horses, wheels, pieces of coats of mail, and arms of various sorts, including no less than a hundred two-handed swords. All of these were made of iron, but with them were several fibulæ of bronze, and some coins, of which about thirty were of bronze, struck at Marseilles, and presenting a head of Apollo on one side and a bull on the other, both good specimens of Greek art. The rest were silver pieces, also struck at Marseilles. These coins, and the absence of any trace of Roman influence, sufficiently indicate the antiquity of these interesting remains.

A very similar collection of antiquities has been obtained from the ancient lake-village near La Tene, on the Lake of Neufchatel. This interesting locality will be referred to again in the chapter on Swiss lake-villages, and I will here only observe that 50 swords, 5 axes, 4 knives, and 23 lances have been discovered, but not a single weapon of bronze. Nine coins have been also found here, while not a single one has been met with in any of the Stone Age or Bronze Age villages. Yet the Gauls had a coinage of their own 300 years before Christ, and in our own country, as Mr. Evans* has well shown, about 150 years later.

* The Coins of the Ancient Britons, 1864, by John Evans, Esq., F.R.S.

Some very interesting "finds" of articles belonging to the Iron Age have been made in the peat bogs of Slesvick, and described by M. Engelhardt, Curator of the Museum at Flensborg. One of these, in the Moss of Nydam, comprises clothes, sandals, brooches, tweezers, beads, helmets, shields, shield bosses, breastplates, coats of mail, buckles, swordbelts, sword sheaths, 100 swords, 500 spears, 30 axes, 40 awls, 160 arrows, 80 knives, various articles of horse gear, wooden rakes, mallets, vessels, wheels, pottery, coins, etc. Without a single exception, all the weapons and cutting implements are made of iron, though bronze was freely used for brooches and other similar articles*.

In the summer of 1862, M. Engelhardt found in the same field a ship, or rather a large flat-bottomed boat, seventy feet in length, three feet deep in the middle, and eight or nine feet wide. The sides are of oak boards, overlapping one another, and fastened together by iron bolts. On the inner side of each board are several projections, which are not made from separate pieces, but were left when the boards were cut out of the solid timber. Each of these projections has two small holes, through which ropes, made of the inner bark of trees, were passed, in order to fasten the sides of the boat to the ribs. The rowlocks are formed by a projecting horn of wood, under which is an orifice, so that a rope, fastened to the horn and passing through the orifice, leaves a space through which the oar played. There appear to have been about fifty pairs of oars, of which sixteen have already been discovered. The bottom of the boat was covered by matting. I visited the spot about a week after the boat had been discovered, but was unable to see much of it, as it had been taken to pieces, and the boards, etc.,

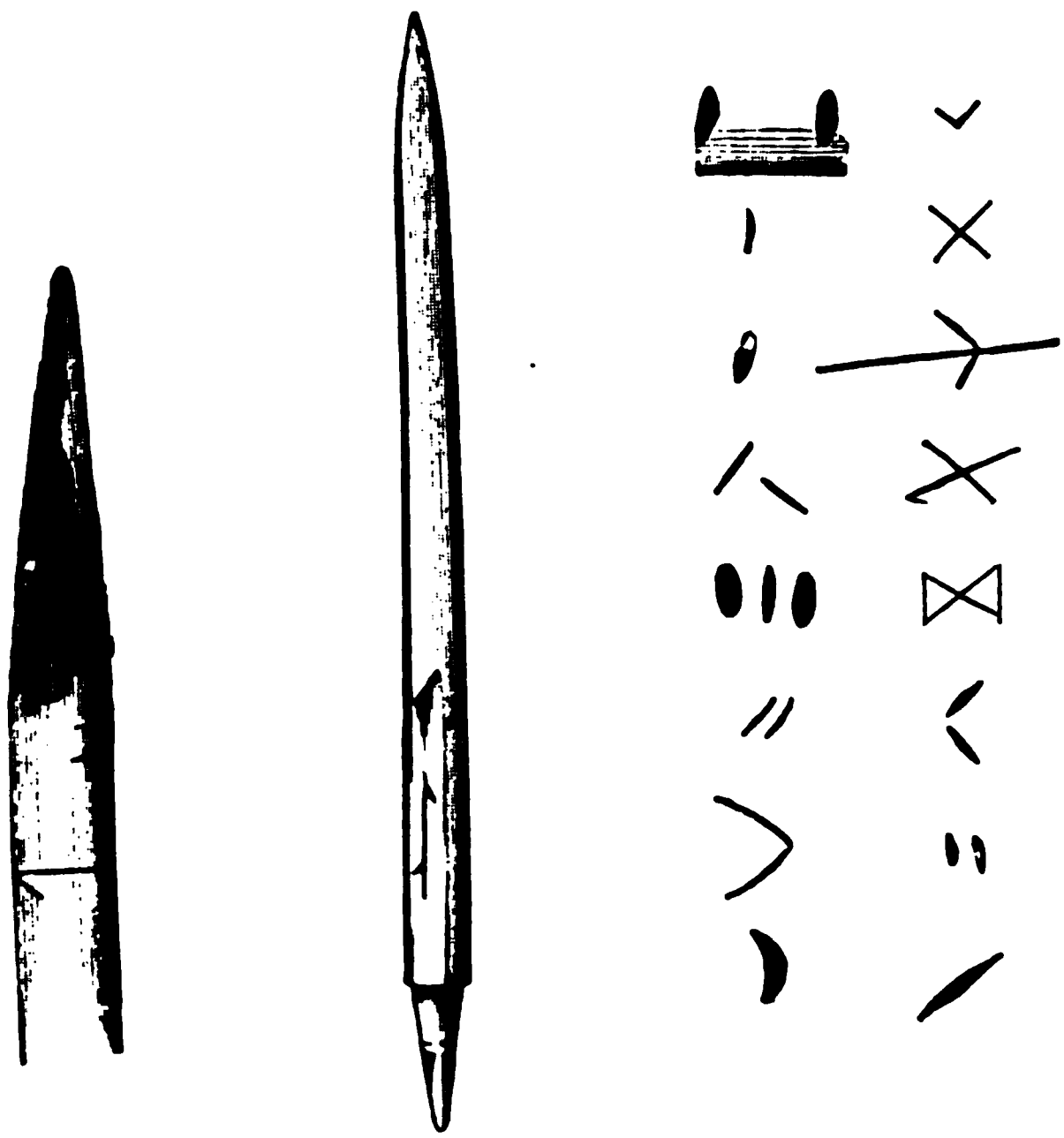
* See Lubbock in Nat. Hist. Rev. Oct. 1863, and Stephens in Gent. Mag. Dec. 1863. On one of the arrows were some Runic characters. I had the pleasure of visiting this interesting spot with M. Engelhardt in 1862. See also "Denmark in the Early Iron Age," by C. Engelhardt.

were covered over with straw and peat, that they might dry slowly. In this manner, M. Engelhardt hoped that they would perhaps, at least in part, retain their original shape. The freight of the boat consisted of iron axes, including a socketed celt with its handle, swords, lances, knives,brooches, whetstones, wooden vessels, and, oddly enough, two birch brooms, with many smaller articles. Only those, however, have yet been found which remained actually in the boat; and, as in sinking it turned partly over on its side, no doubt many more articles will reward the further explorations which M. Engelhardt proposes to make. It is evident that this ancient boat was sunk on purpose, because there is a square hole about six inches in diameter hewn out of the bottom; and it is possible that these objects were sunk as offerings to the Lake, but, on the whole, it seems to me more probable, that in some time of panic or danger the objects contained in it were thus hidden by their owner, who was never able to recover them. Even in recent times of disturbance, as, for instance, in the beginning of this century, and in 1848, many arms, ornaments, household utensils, etc., were so effectually hidden in the lakes and peat mosses, that they could never be found again. Much interest is added to this vessel and its contents, by the fact that we can fix almost their exact date. The boat lies, as I have already mentioned, within a few yards of the spot where the previous discoveries at Nydam were made, and as all the arms and ornaments exactly correspond, there can be little doubt that they belong to the same period. Now the previous collection included nearly fifty Roman coins, ranging in date from A.D. 67 to A.D. 217, and we cannot therefore be far wrong in referring these remains to the third century.

A very similar discovery has been made at Thorsbjerg in the same neighbourhood, but in this case, owing to some chemical difference in the peat, the iron has been almost

entirely removed. It may naturally be asked why then this should be quoted as an instance of the Iron Age? And the answer seems quite satisfactory. All the swords, lance-heads and axe-blades have disappeared, while the handles of bronze or wood are perfectly preserved, and as the ornaments and other objects of bronze are well preserved, it is evident that the swords, etc., were not of that metal; and it is therefore reasonable to conclude that they were of iron, more especially as the whole character of the objects resembles that of those found at Nydam, and the coins, which are about as numerous as those from the latter place, range from 60 A.D. to A.D. 197; so that these two great "finds" may be regarded as almost contemporaneous.

FIG. 1. FIG. 2. FIG. 3.



Not only are the weapons in these finds all of iron, but

their forms and the character of the ornamentation are very different from those of the Bronze Age; resembling in some respects Roman arms, in others they are quite peculiar, and evidently representative of northern art.

Many of the arrows had owner's marks on them (figs. 1 and 3) resembling those on the modern Esquimaux arrows (fig. 2). The Nydam swords also bear seven inscriptions; three of them are illegible, the others are "ricus, riccim, cocillus, and umored." On the umbo of one of the shields is inscribed, in dotted Roman letters, AEL. AELIANUS; while another one has a short Runic* inscription, which Mr. Haigh reads as Aisc Ah (Aisc owns) †; two figures resembling Runic letters are also inlaid with golden wire on one of the sword blades. One of the Thorsbjerg scabbards also has a Runic inscription of two lines, each containing ten letters.

I particularly dwell on these cases, because no inscriptions or coins have yet been found in any antiquities which can be referred to the Bronze Age.

For the same reason the abundance of silver is very significant; out of two hundred buckles and square silver girdle ornaments, the greater number are of bronze plated with silver, and silver was also used to ornament shield rims, sandals, brooches, breast-plates, sword-hilts, sword-sheaths, girdles, harness, etc., as well as for clasps, pendants, boxes, and tweezers, while one helmet was formed entirely of this comparatively rare metal.

The ornamentation also of the shields, etc., is of a character altogether unlike any that occurs in the Bronze Age.

An assemblage of objects very similar to those of Nydam and Thorsbjerg has also been found in the "Vimose" or "Moss of the Temple." It comprises no less than 1500 lance-heads, 40 axes, and 30 swords, all of iron; abundance of silver; one Roman and three Runic inscriptions; and a coin of Faustina

* See Appendix No. 1.

Junior. Here, again, bronze weapons are entirely absent, though bronze was used for ornaments, etc.

From these and similar discoveries, it appears evident that the use of bronze weapons had been discontinued in the North before, probably long before, the commencement of our era. From the ease with which bronze could be worked, this metal was still used for brooches and ornaments; but in the manufacture of swords, axes, and similar implements, it had been entirely superseded by iron. There are many cases on record of iron swords with bronze handles or scabbards, but scarcely an instance of the reverse.

Conversely, as bronze weapons are entirely absent from the great "finds" of the Iron Age, so are iron weapons altogether wanting in those instances where, as for instance at Nidau, on the Lake of Bienne, and Estavayer, on that of Neufchatel, large quantities of bronze tools and weapons have been found together.

To sum up this argument, though the discoveries of bronze and of iron weapons have been very numerous, yet there is hardly a single case in which swords, axes, daggers, or other weapons of these two different metals have been found together; nor are bronze weapons found associated with inscriptions, or with coins, pottery, or other relics of Roman origin.

So, also, though no doubt stone weapons were used during the Bronze Age, there are many cases in which large numbers of stone implements and weapons have been found without any of metal.

In illustration of this argument, I must call attention to the following table. Objects found singly teach us comparatively little, but when numbers occur together they become much more instructive. The first ten localities are some of the Swiss lake-villages, which will be described in Chapter VI.; the eleventh is the Nydam find just alluded to.

Now from the ancient lake-village in the peat moss of Moosseedorf we have a list comprising 75 flint nuclei, 25 arrow-heads, 12 spear-heads, 90 scrapers, 30 saws, 96 axes, 310 long flakes, and about 2000 small ones, 25 hammers, 45 grindstones, etc., 71 awls of bone, 12 pointed ribs, 160 bone chisels, 18 sharpened boar's teeth, 8 perforated boar's teeth, 2 perforated bear's teeth, 5 harpoons of horn, 8 chisels and 4 awls of horn, besides 30 axe-handles or sockets, without a trace of metal. The result, so far as six stations are concerned, is shown in the following table (p. 15).

If, for instance, we commence with the remains discovered at Wangen, on the Lake of Constance, we have an even more remarkable case. M. Löhle has found there more than 1500 axes, 100 whetstones, 150 corn-crushers, and 2500 arrow-heads, flint flakes, chips, etc.; altogether more than 4450 instruments of stone, besides about 350 of bone, making, with 100 earthenware spinning-weights, a grand total of nearly 5000 objects, and yet not a trace of metal. The number of corn-crushers and spindle-whorls is interesting, when we remember that Wangen alone, among these four localities, has supplied us with specimens of carbonized grain, and flax fabrics.

Now let me ask the reader to compare with the four cases given in the table on page 15 the list of remains from the Bronze Age settlements of Morges, Nidau, Estavayer, Cortaillod, and Corcelettes. The manner in which the collections were made accounts, probably, for the absence of whetstones, and, perhaps, to a great extent, for that of the flint flakes, etc. On these points, therefore, I lay little stress; but the total absence of stone axes at Morges, and their rarity at Nidau and Estavayer, is very remarkable. At the former M. Forel, after the most careful search, has found but one object of iron. The large number of corn-crushers and the presence of spinning-weights are also significant.

Col. Schwab's splendid collection from Nidau tells the same tale. He has only 33 stone axes, and yet as many as 335 corn-crushers. The other articles of stone he has not apparently collected. He has nearly 200 spindle-whorls, and many earthenware rings, specimens of which have also been found at Morges, but which are entirely wanting at the Pont de Thiele, at Wauwyl, at Moosseedorf, and at Wangen.

It is, of course, possible that very different states of civilization may co-exist in different parts of the same country; but in this case we must remember that the settlement at Nidau is only about fifteen miles from Moosseedorf. Nor can we suppose that the differences were merely a question of wealth; the bronze fish-hooks, axes, small rings, pins, etc., which are found in such large numbers, show that bronze was used not for the articles of luxury only, but also for the ordinary implements of daily life.

Nor is it only in the presence or absence of bronze that the Pfahlbauten differ from one another; there are many other indications of progress. We cannot expect to find much evidence of this in the implements of bone or stone; but, as has already been mentioned, the better forms of stone axe, and those which are perforated, are very rare, if not altogether absent in the Stone Age, none having been found at the Pont de Thiele, at Moosseedorf, or at Wauwyl, and only two at Wangen.

Again, it is not only by the mere presence of bronze, but by the beauty and variety of the articles made out of it, that we are so much struck. In a collection of objects made at any of the Stone Age settlements, no one can fail to remark he uniformity which prevails. The wants of the artificers seem to have been few and simple. In the Bronze Age all this is altered. We find not only, as before, axes, arrows, and knives, but, in addition, swords, lances, sickles, ear-rings, bracelets, pins, rings, and a variety of other articles.

	STONE.					BRONZE.								IRON.							COINS.
	Axes.	Arrows.	Flakes.	Other Objects.	Total.	xes.	Knives.	Lances.	Sickles.	Fish-Hooks.	Ornaments.	Sundries.	Total.	Swords.	Axes.	Knives.	Lances	Ornaments.	Sundries.	Total.	
SWITZERLAND.																					
Wangen	1500	...	2500	450	4450	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0
Moosscedorf...	100	25	2300	277	2702	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0
Nussdorf	1000	100	100	30	1230	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0
Wauwyl	43	36	200	147	426	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0
Nidau	33	?	?	335 Corn-crushers	368	23	102	27	18	109	1420	305	2004	...	...	...	...	...	...	...	0
Cortaillod	?	?	?	?		13	22	4	2	71	515	208	835	...	...	...	...	...	...	...	0
Estavayer	?	?	?	?		6	14	...	1	43	403	150	617	...	...	...	...	...	...	...	0
Corcelettes ...	?	?	?	?		1	19	2	7	...	465	16	510	...	...	...	...	...	...	...	0
Morges	0	?	?	Many Corn-crushers		50	20	11	11	10	108	?	210	...	...	...	...	...	1	1	0
Marin	...	...	Some	12 Balls		1 Pierced	...	...	...	...	1	13	15	50	5	4	23	More than 100	61	250	9
DENMARK.																					
Nydam	...	...	...	A few Whet-stones		...	...	...	...	...	...	Ornaments very numerous	...	100	20	86	500 at least	?	300 at least	1000 at le	34

The pottery tells the same tale. The potter's wheel indeed seems to have been unknown during both the Bronze and Stone Ages, but the material of which the Stone-age pottery is composed is rough*, containing large grains of quartz, while that used during the Bronze Age is more carefully prepared. The ornaments of the two periods show also a great contrast. In the Stone Age they consist of impressions made by the nail or the finger, and sometimes by a cord twisted round the soft clay. The lines are all straight, or if curved are very irregular and badly drawn. In the Bronze Age all the patterns present in the Stone Age are continued, but in addition we find circles and spirals; while imitations of animals and plants are characteristic of the Iron Age.

So again the distinction between the Bronze and Iron Ages does by no means rest merely on the presence of iron. The pottery is different, the forms of the implements and weapons are different, the ornamentation is different, the knowledge of metallurgy was more advanced, silver and lead were in use, letters had been invented, coins had been struck. The entire absence of silver, of coins, and of inscriptions, in the bronze finds, is very remarkable.

The value of this evidence will be better appreciated after reading the following extract from Mr. Wright's Essays on Archæology †:

"All the sites of ruined Roman towns with which I am acquainted present to the excavator a numerous collection of objects, ranging through a period which ends abruptly with what we call the close of the Roman period, and attended with circumstances which cannot leave any doubt that this was the period of destruction. Otherwise, surely we should find some objects which would remind us of the subsequent

* The extreme coarseness of the Swiss Lake pottery is, perhaps, partly owing to its having been intended for kitchen purposes; for the vessels found in tumuli of the Stone Age, the material was often more carefully prepared.

† Essays on Archæology, p. 105.

periods. I will only mention one class of articles which are generally found in considerable numbers, the coins. We invariably find these presenting a more or less complete series of Roman coins, ending at latest with the Emperors who reigned in the first half of the fifth century. This is not the case with Roman towns which have continued to exist after that period, for then, on the contrary, we find relics which speak of the subsequent inhabitants, early Saxon and Mediæval. I will only, for want of space, give one example, that of Richborough, in Kent. The town of Rutupiæ seems to have capitulated with the Saxon invaders, and to have continued until its inhabitants, in consequence of the retreat of the sea, gradually abandoned it to establish themselves at Sandwich. Now the coins found at Richborough do not end with those of the Roman emperors, but we find, first, a great quantity of those singular little coins which are generally known by the name of minimi, and which, presenting very bad imitations of the Roman coinage, are considered as belonging to the age immediately following the Roman period, and preceding that of the Saxon coinage."

We may assume, then, on the authority of Mr. Wright himself, that if all the bronze arms which are so abundant in our museums were really of Roman origin, many of them would have been found from time to time in conjunction with other Roman remains; whereas bronze weapons are never found in association with coins, pottery, or other relics of Roman origin.

Mr. Wright, indeed, has called this fact in question, but in spite of his profound acquaintance with archæological literature, he has only been able to bring forward three cases in support of his argument, not one of which appears to me to be satisfactory.

For a full statement of his views I must refer to his Memoir on Bronze Weapons, in the Transactions of the Eth-

nological Society *, which, in conjunction with my brother Frederic, I have endeavoured to answer before the same learned body †. I will, however, refer to the only three cases which Mr. Wright has been able to discover.

The first is that of the bronze sword figured in Stuart's Caledonia Romana, Pl. v. "This sword," says Mr. Wright, "is stated to have been found at the Roman station of Ardoch, in Scotland, on the wall of Antoninus, and there appears no reason to doubt the statement." In truth, however, there is no such statement; Mr. Wright has been misled by the fact that the sword is figured on the same plate with some Roman remains from Ardoch.

The second case quoted by Mr. Wright is that of a sword described by Mongez before the French Institute, on the "16th Prairial, An. 9," i. e. 5th June, 1801. It is stated to have been found in a peatmoss at Heilly, near Abbeville, with the skeletons of a man and a horse, and four coins of the Emperor Caracalla. "This sword, therefore," says Mr. Wright, "was that of a Roman cavalry soldier, not older, and perhaps a little later, than this reign, who had sunk in the bog to which this turbary had succeeded."

Mongez, on the contrary, concluded that the skeleton could not have been that of a cavalry soldier at all, because a cavalry soldier would not have been armed with a short sword; and so far from regarding the sword as Roman, "on ne pourroit," he says, "également pas l'attribuer aux Romains, si l'on ne raisonnoit que d'après la matière dont elle est faite ‡." And in the next page he adds, "We are therefore certain, that after the second Punic war, the Roman swords were made of iron §."

It is true that five months later he altered his opinion, and

* Transactions of the Ethnological Soc., N.S. vol. iv. p. 176.

† Ditto, N.S. vol. v. p. 105.

‡ Loc. cit., p. 193.

§ "Nous voilà donc certains que l'épée des Romains, depuis la seconde guerre Punique, fut fabriquée en fer," p. 194.

came to the conclusion that, after all, the bronze swords were Roman, but we cannot consider that much weight should be attached to this opinion, which was in direct opposition to that entertained by the same learned antiquary a few months previously.

Finally, Mr. Wright cites an instance of a bronze sword found with some Roman coins of Maxentius, who reigned from 306 to 312 A.D. This sword was discovered in a turbary at Piquigny, near Abbeville, in a large boat, which it would seem had been sunk, and in which were several skeletons. The reason for referring this bronze sword to the Roman epoch, was the presence in this case, as in the last, of Roman coins. But it is somewhat remarkable, that in both instances the antiquaries who recorded the discovery attributed so little importance to the presence of these coins, that they did not take the trouble to specify the exact position which they occupied with reference to the bronze weapons; in fact they only mention them casually, and as it were by an after-thought, in a foot-note. We may be pardoned, then, if we do not ourselves look upon these coins as being certainly of the same date as the weapons near which they are said to have been discovered. Others may be of a different opinion, but even if it be admitted that in these two cases bronze weapons were actually discovered in association with Roman coins, and in such a position that the weapons and the coins must certainly have been embedded together, still, when we consider the great abundance of Roman coins on the one hand, and of bronze weapons on the other, we cannot be surprised that there should be one or two cases in which they have been found associated together.

Mr. Wright indeed states that, "instead of our not finding the bronze swords in juxta-position with Roman remains, in every case where they have been found in Britain or Gaul, where the details of the discovery have been carefully

observed, it has occurred under circumstances which lead to the strongest presumption of their being Roman." Yet we have seen that, in spite of his great acquaintance with archæological literature, he has only been able to bring forward three cases, one of which is founded on an error, while the other two seem hardly more satisfactorily established.

Again, the geographical distribution of bronze weapons and implements does not favour such a theory. The Romans never entered Denmark; it is doubtful whether they ever landed in Ireland, no Roman road, masonry, or earthwork, has ever been found there. Yet while more than 350 bronze swords have been found in Denmark, and a very large number in Ireland *, I have only been able to hear of six bronze swords in Italy. The rich museums at Florence, Rome, and Naples do not appear to contain a single specimen of those typical, leaf-shaped bronze swords, which are, comparatively speaking, so common in the North. That the bronze swords should have been introduced into Denmark by a people who never occupied that country, and from a part of Europe in which they are very rare, is, I think, a most untenable hypothesis.

I may add that no swords or celts of bronze have been found in the excavations at Pompeii.

Moreover, the use of the word "ferrum" (iron), as synonymous with a sword, clearly proves that the Roman swords were made of that metal.

I have already mentioned that silver and lead do not occur in Bronze Age finds, that coins and letters are equally absent, and that the ornamentation of the Bronze Age, though sometimes very beautiful, is not of a Roman character.

Lastly, the bronze which was so largely used by the

* The Museum at Dublin contains 282 swords and daggers: unluckily, the number of swords is not stated separately.

Romans for ornaments, etc., was composed partly of lead, whereas that of the Bronze Age consists of copper and tin only. Other metals, indeed, such as iron, silver, nickel, and lead itself, are present; but in small quantities, never having been purposely introduced, but only occurring as impurities.

The reasons, then, which satisfy me that our bronze weapons cannot be referred to Roman times, may be summed up as follows :—

Firstly. They have never been found in company with Roman pottery, or other remains of the Roman period.

Secondly. They are very abundant in some countries, as for instance in Denmark and Ireland, which were never invaded by Roman armies.

Thirdly. The bronze swords do not resemble in form those used by Roman soldiers.

Fourthly. The Latin word "ferrum" was used as synonymous with a sword, showing that the Romans always used iron.

Fifthly. The ornamentation is not Roman in its character.

Sixthly. The bronze used by the Romans contained, generally, a large proportion of lead, which is never the case in that of the Bronze Age.

Nor is there any subsequent period to which we can refer the weapons and implements of bronze. Great numbers of Saxon interments have been examined both in this country and on the Continent, and we know that the swords, lances, knives, and other weapons of that time, were all of iron. Besides this, if the bronze implements and weapons had belonged to post-Roman times, we should certainly, I think, have found some of them in the ruined towns, and with the pottery and coins, of that period. Moreover, the similarity to each other of the weapons found in very distant parts of Europe, implies more extended intercourse between different

countries than any which existed in those centuries. On the whole, then, the evidence appears to show that the use of bronze weapons is characteristic of a particular phase in the history of European civilization, and one which was anterior to the discovery of iron, or, at any rate, to the general use of that metal for cutting purposes.

It is, moreover, I think, clearly established that the use of iron was general throughout Northern Europe for a considerable time before the invasion of Cæsar.

Evidently, however, the transition from the use of bronze weapons, to those of iron must have been gradual, and there must have been a time when the two were in use together.

M. Ramsauer, for many years director of the salt-mines at Hallstadt, near Salzburg, in Austria, has discovered an extensive cemetery belonging to this transitional period. He has opened no less than 980 graves, evidently of those who even at that early period worked the salt-mines which are still so celebrated. The objects discovered are described and figured in an album, which has unfortunately never been published, but of which Mr. Evans and I secured a copy. The following table will sufficiently prove the importance of the discovery.

That the period to which these graves belonged was that of the transition between the Bronze and Iron Ages, is evident; both because we find cutting instruments of iron as well as of bronze, and also because both are of somewhat unusual, and we may almost say of intermediate, types. The same remark applies to the ornamentation. Animals are frequently represented, but are very poorly executed, while the geometrical patterns are well drawn. Coins are entirely absent. That the transition was from bronze to iron, and not from iron to bronze, is clear; because here, as elsewhere, while iron instruments with bronze handles are common, there is not a single case of a bronze blade with an iron

TABLE C.

No. of the Graves.	GRAVES WITH BODIES BURIED IN THE ORDINARY MANNER. ANTIQUITIES.											
	Gold Ornaments	Bronze.				Iron.		Amber.	Glass.	Pottery.	Stone.	
		Ornaments	Vessels.	Sundries.	Weapons	Weapons.	Other Objects.	Ornaments.				
527	6	1171	8	35	18	161	83	165	38	334	57	

No. of the Graves.	GRAVES WITH BURNT CORPSES. ANTIQUITIES.											
	Gold Ornaments	Bronze.				Iron.		Amber.	Glass.	Pottery.	Different Objects.	
		Ornaments	Vessels.	Sundries.	Weapons.	Weapons.	Other Objects.	Ornaments.				
453	58	1744	179	54	91	349	41	105	35	908	100	
Totals. 980	64	3215	182	89	109	510	74	270	73	1242		5985

handle. This shows that, when both metals were in use, the iron was preferred for blades. Another interesting point in the Hallstadt bronze, as in that of the true Bronze Age, is the absence of silver, lead, and zinc (excepting, of course, as mere impurities in the bronze). This is the more significant, inasmuch as the presence, not only of the tin itself, but also of glass, amber, and ivory, indicates the existence of an extensive commerce.

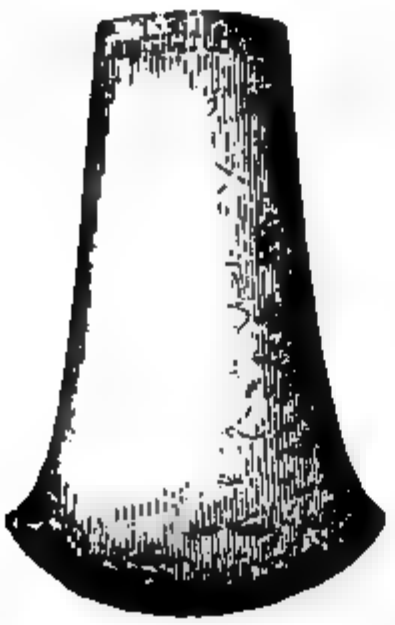
Moreover, as Morlot well pointed out, the absence of silver cannot be accidental, because the bronze of Hallstadt contains no lead, and the absence of lead entails that of silver, since the latter could not, at least in Europe, be obtained without the former.

CHAPTER II.

ON THE USE OF BRONZE IN ANCIENT TIMES.

THE commonest and, perhaps, the most characteristic objects belonging to the Bronze Age, are the so-called "celts" (figs. 4–16) which were probably used for chisels,

FIG. 4.



Copper Celt from Waterford.

FIG. 5.

Winged Celt from Ireland.

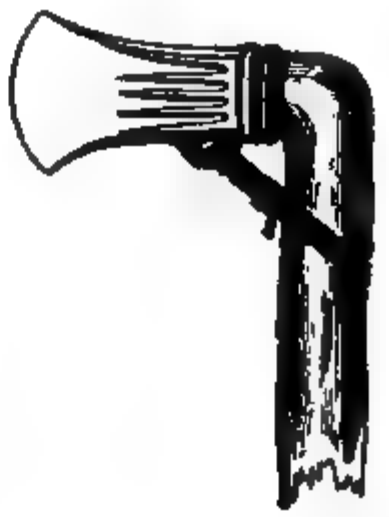
FIG. 6.

Socketed Celt from Ireland.

FIG. 7.

FIG. 8.

F:G. 9.



The three different types of Celts, and the manner in which they are supposed to have been handled.

hoes, war-axes, and a variety of other purposes. Implements

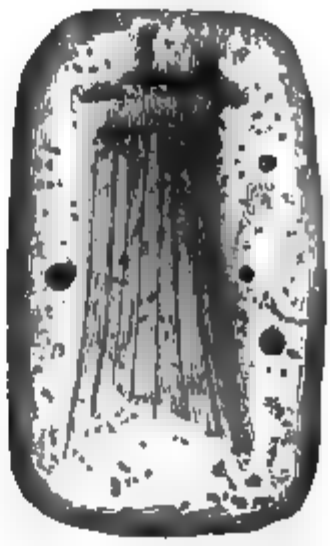
Fig. 10.

Kalmuck Axe.

Fig. 11.

Copper (?) Celt from Ireland.

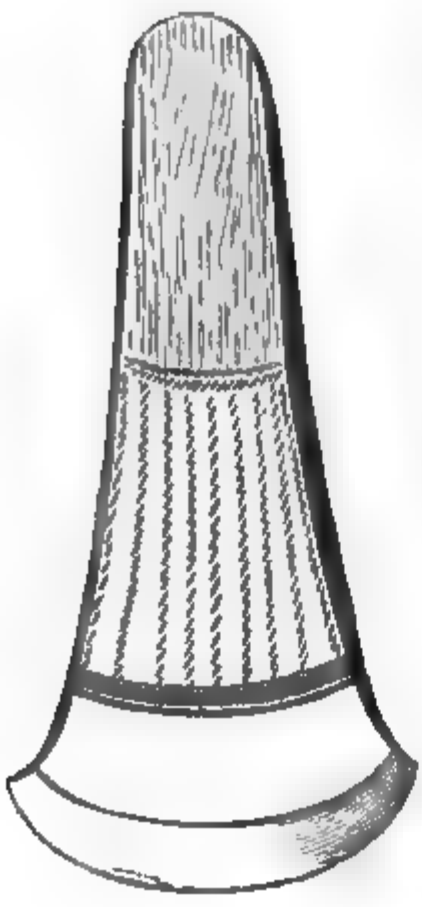
Fig. 12.



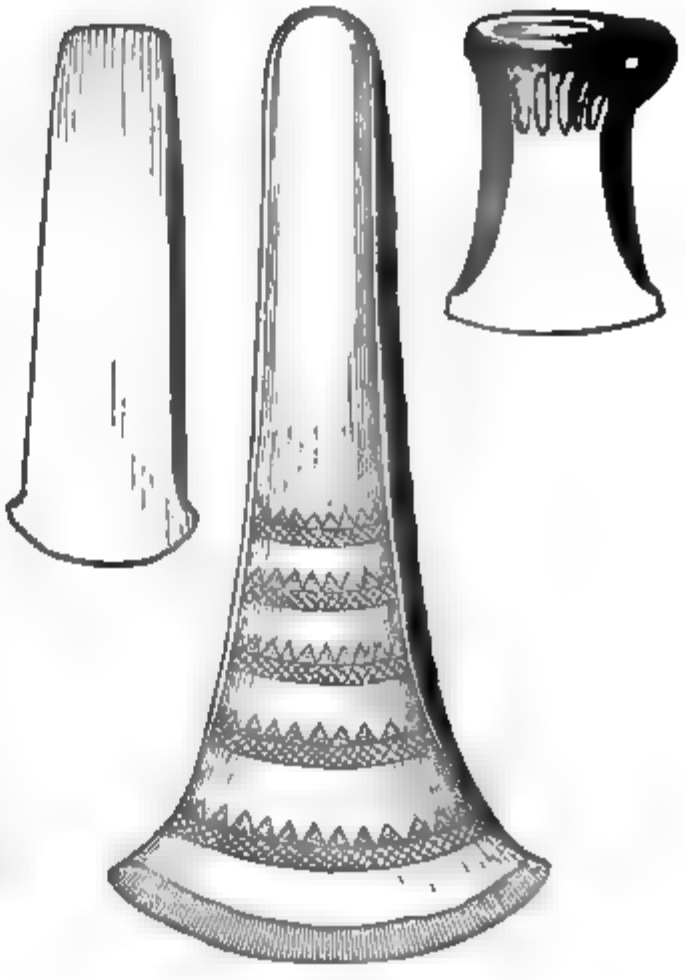
Celt-mould from Ireland.

Fig. 14. Fig. 15. Fig. 16.

Fig. 13.



Decorated Celt from Ireland.



Danish Celts.

similar, though not identical, and made of iron instead of bronze, are even now employed in Siberia (fig. 10) and some parts of Africa*. More than two thousand are known to exist in the different Irish collections, of which the great Museum belonging to the Royal Irish Academy at Dublin contained in the year 1860 no less than six hundred and eighty-eight†, no two of which were cast in the same mould. They vary in size from an inch to a foot in length, and may be divided into three principal classes (figs. 7–9) according to the manner in which they were handled; though

Fig. 17.

Bronze Axe. Naples.

Fig. 18.

Bronze Axe. Le Puy.

Fig. 19.

Stone Axe.

* Klemm's Culturgeschichte der Menschen, vol. iii. p. 160. Horse females, p. 77.

† In the Museum at Edinburgh are more than 100, at Copenhagen 360.

we must remember that there were many intermediate forms. The first class (figs. 4, 7, 11, 13, 14, and 15) is the simplest in form, and is considered by some antiquaries (as, for instance, by Sir W. R. Wilde*) to be the oldest, partly because they are "evidently formed on the type of the old stone celts," (conf. figs. 11 and 18 with figs. 19 and 160) partly because some of them (nearly thirty for instance in the Dublin Museum) are of red, almost unalloyed, copper, and are "almost the only antique implements of any kind formed out of" this metal, and partly because the copper ones at least are always unornamented. On the other hand, the simplicity of form exhibited by the copper axes, which may be observed in those from other countries as well as from Ireland, is perhaps to be accounted for by the great difficulty of casting copper, so that the founders, when dealing with that metal, would naturally confine themselves to the simpler forms. There can be little doubt that these simple celts were handled in the manner indicated (fig. 7). Fig. 20 represents a modern African axe in my collection. Here, however, the blade is of iron.

FIG. 20.

African Axe.

Evidently, however, in such an axe the blade would tend to split the handle in which it was placed. To remedy this

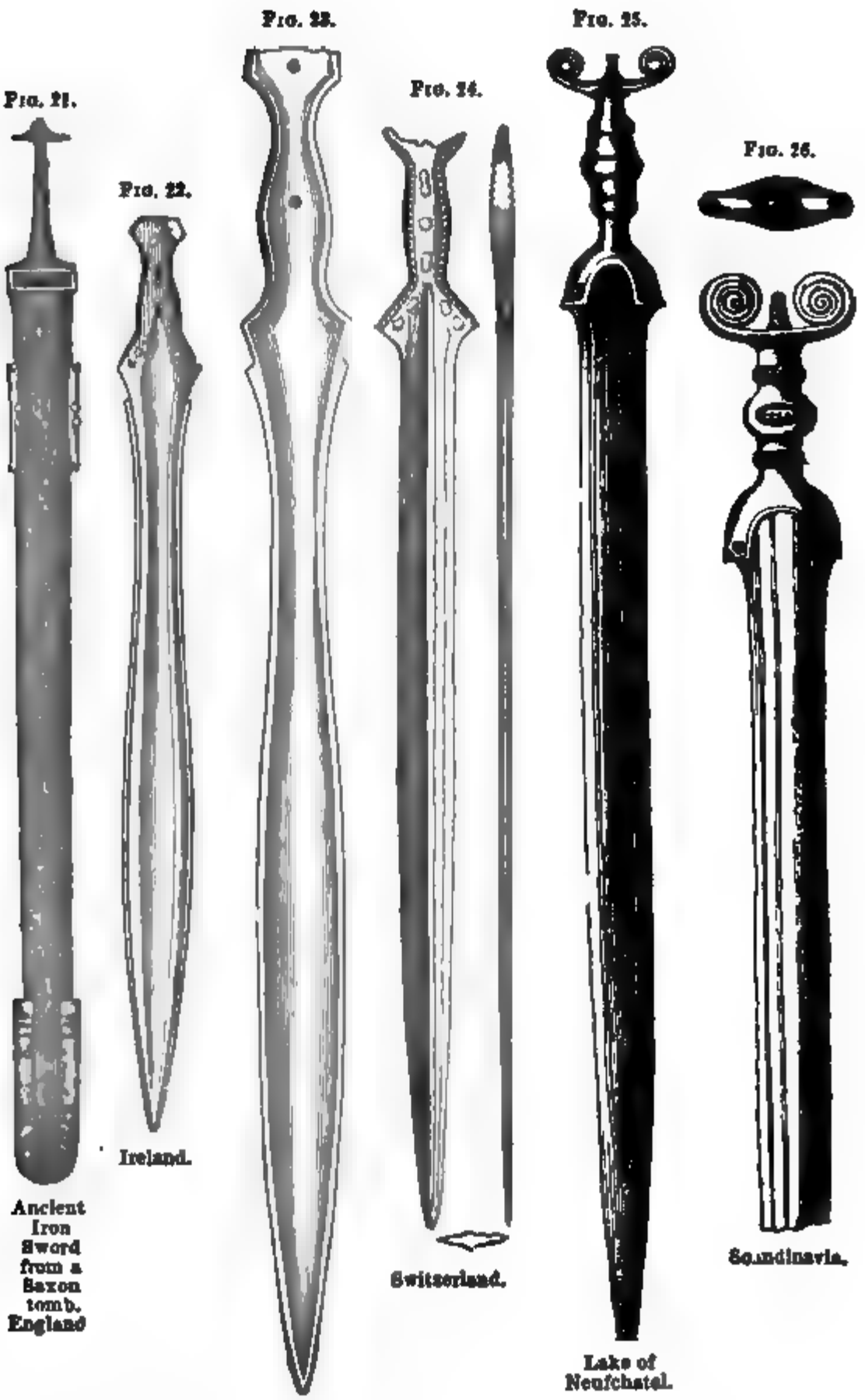
* Cat. Ir. Acad., p. 361.

defect, a stop, or ridge, was raised across the celt, and the metal and wood were made to fit into one another (figs. 5 and 8). This second form of celt is known as a Paalstab, or Paalstave, and has often a small loop on one side (the supposed use of which is indicated in the figure), as well as a wing on each side. A still further improvement consisted (figs. 6, 9, 16) in reversing the position of the metal and the handle, making the axe hollow at one end, and so passing the handle into it.

Bronze celts are generally plain, but sometimes ornamented with ridges, dots, or lines, as in figs. 6, 9, 13, 15, and 16. That they were made in the countries where they are found, is proved by the presence of moulds (fig. 12). It is difficult to understand why the celt-makers never cast their axes as we do ours, with a transverse hole, through which the handle might pass. No bronze implements of this description has, however, so far as I know, been yet found in Great Britain, though a few have occurred in Denmark, where they are of great beauty and highly decorated.

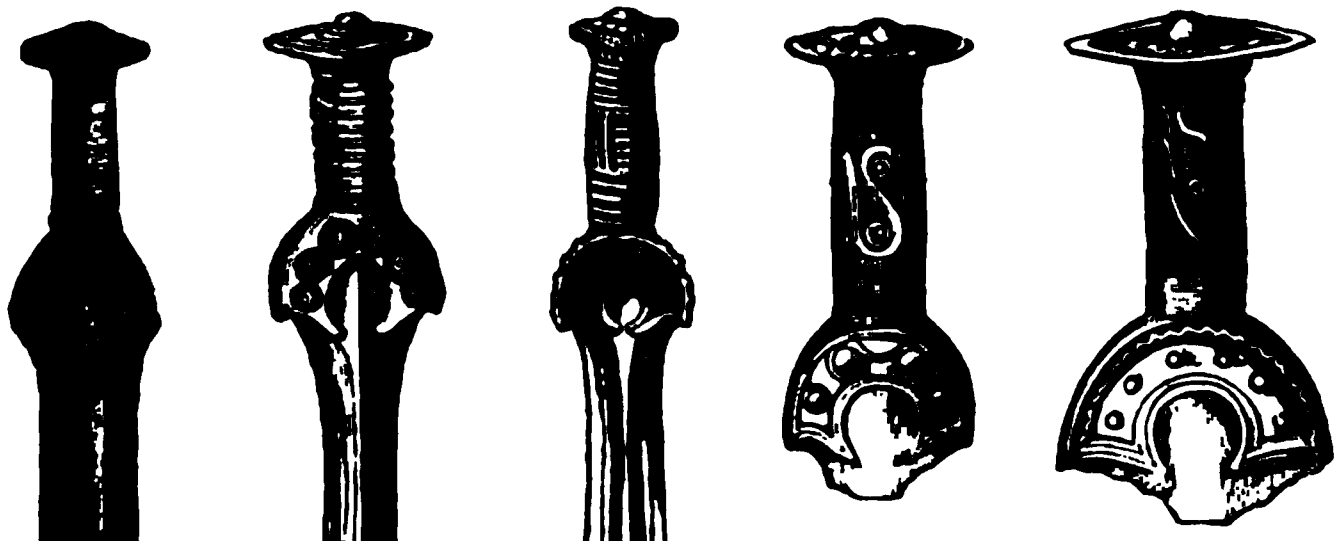
The swords of the Bronze Age (figs. 22–29 *), are always more or less leaf-like in shape, double-edged, sharp-pointed, and intended for stabbing and thrusting, rather than for cutting. This is evident, not only from the general shape, but also from the condition of the edges. They never have any handguards: the handles are sometimes solid (figs. 25–31); this is generally the case with those found in Denmark: sometimes (figs. 22–24) flat, thin, and evidently intended to be plated with wood or bone: while sometimes the sword expands at its base, and is fastened to a handle by from two to four rivets. Swords of this class are generally shorter than the others, and indeed we find every intermediate form between the true sword and the dagger (figs. 32, 33, 34):

* In Fig. 21 an ancient iron sword is represented, in order to show the difference in form.

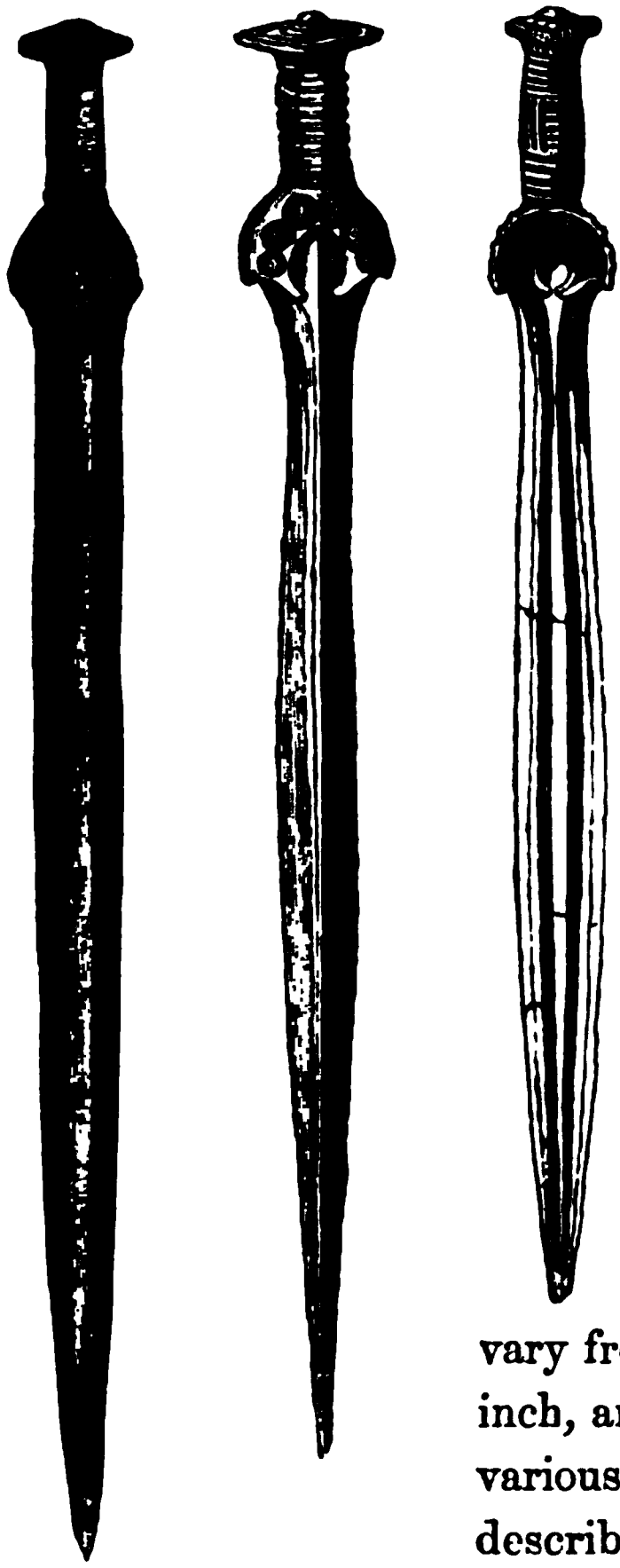


Bronze Swords.

of the two classes together, the Dublin Museum contains nearly 300. The handles of the bronze swords are very short, and could not have been held comfortably by hands as large as ours, a characteristic much relied on by those who attribute



Sword-handles from Denmark.



Swords from Denmark.

the introduction of bronze into Europe to a people of Asiatic origin. The Danish Museum contains more than 350 bronze swords.

The next classes of bronze objects are the heads of *spears* (figs. 35, 36), *javelins*, and *arrows;* two hundred and seventy-six of which are in the Dublin Museum; in length they vary from two feet and a half to an inch, and their shapes are also very various: but it is unnecessary to describe them in detail, because they are repeated in similar weapons of all ages, countries, and materials. Bronze arrows, however, are not very common in Northern Europe, probably because flint was so much cheaper, and almost as effective.

More than a hundred bronze *fish-hooks* have been found at Nidau in the Lake of Bienne, but elsewhere they appear to be rare; the Museum at Dublin contains only one. *Sickles* are more numerous; at Copenhagen there are twenty-five, at Dublin eleven; in the Lake-village at Morges eleven have

FIG. 33.

FIG. 32.

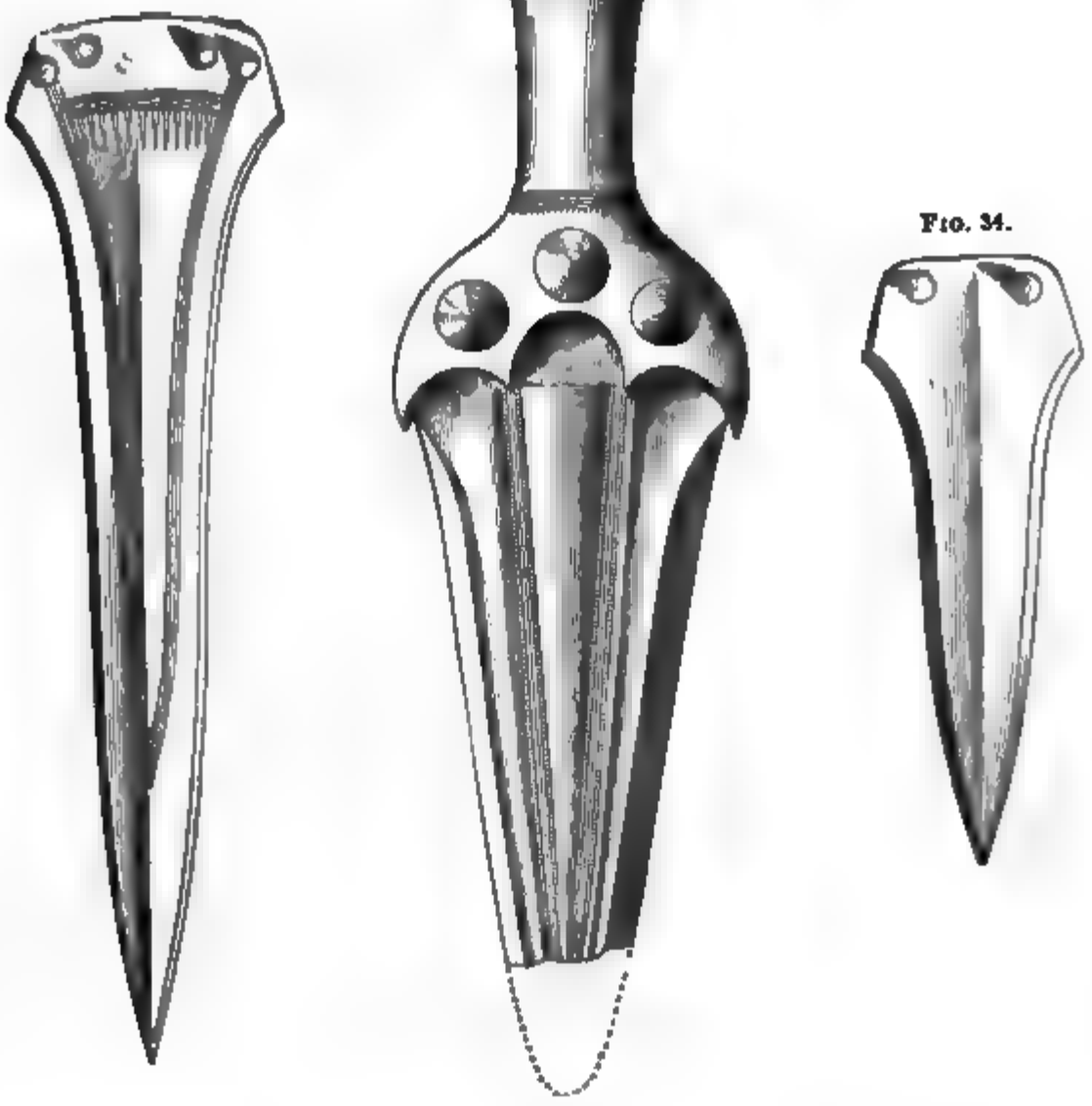


FIG. 34.

Irish Bronze Daggers.

been found, at Nidau eighteen; they are generally about six inches in length, flat on one side, and raised on the other; they were always intended to be held in the right hand.

Bronze *knives* (figs. 37–41) are frequently found in the Danish tumuli, and among the remains of the Swiss lake habitations; twenty, for instance, at Morges, twenty-six at Estavayer, and about a hundred at Nidau: in Ireland they appear to be very rare; the Dublin Museum does not contain one. They were generally fitted into handles of bone, horn, or wood, and the blade was almost always more or less curved, those of iron knives, on the contrary, being generally straight.

Fig. 48 represents a bronze knife found at Thebes by Sir Gardner Wilkinson, and figured in Lee's translation of Keller, p. 276 *.

Fig. 35. Fig. 36.

Spear-heads from Ireland.

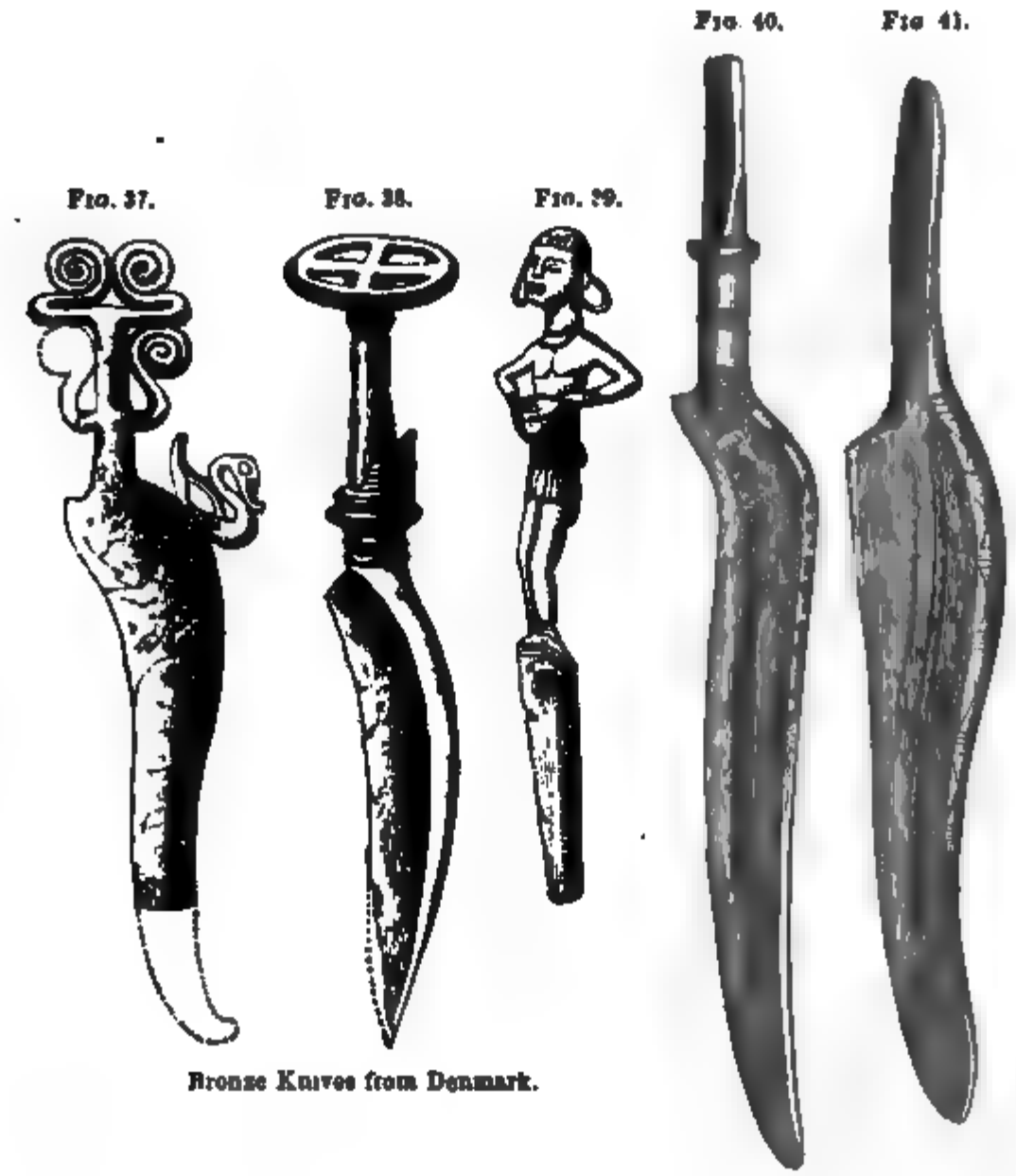
The small bronze *razor-knives* (figs. 42–45), indeed, have straight edges, but they are quite of a different character from the iron knives: from the ornaments engraved on them, I am disposed to regard them as belonging to a late period in the Age of Bronze, if not in some cases to the beginning of that of Iron. Indeed, the Flensborg Museum contains a razor-knife, said to have been found together with objects of the latter metal.

Ornaments of bronze do not, like the weapons of that metal, characterize a definite period, but may belong to any age. Therefore, before we refer any particular ornament to this period, we must know the circumstances under which it was found. The following illustrations are principally from the Swiss lake villages.

The personal *ornaments* which may, I think, safely be referred to the Bronze Age, consist principally of bracelets

* See also for Egyptian Bronze implements and weapons Mr. A. Arcelin's paper in the Mater. p. Ser. à l'Hist. Prim. de l'Homme, 1869, p. 376.

(figs. 49, 50), pins (figs. 51–53), and rings. The bracelets are either simple spirals, or rings open at one side, and decorated by those combinations of straight and curved lines so characteristic of the Bronze Age. Like the weapons, they generally indicate small hands, but, like the bronze ornaments of various existing savages—for instance, of many Negro tribes, of the Khonds in Orissa, &c.—they are often extremely heavy.



Bronze Knives from Denmark.

Bronze Knives from Switzerland.

Bronze pins are very abundant: for instance, 57 have been obtained from Morges, 239 from Estavayer, and 600

from Nidau. They are also very frequently found in graves, where they were used, as pointed out by Sir R. C. Hoare, to secure the linen cloth which enveloped the bones. Although

Fig. 42. Fig. 43. Fig. 44. Fig. 45.

Razor-knives from Denmark.

Fig. 46.

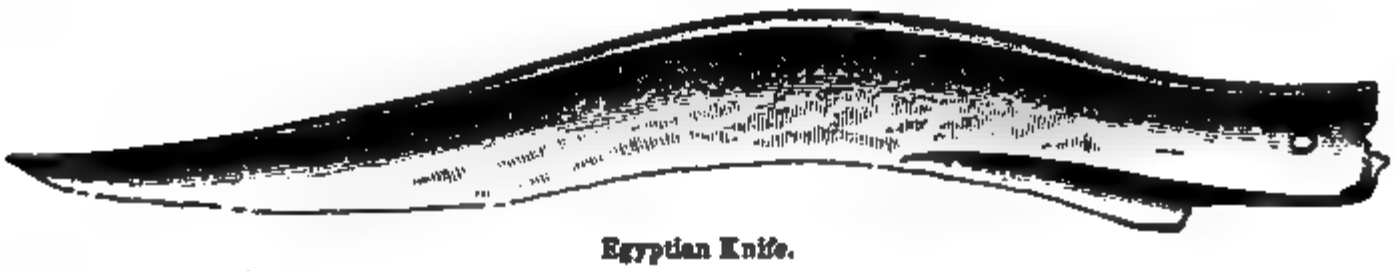
Fig. 47.

Small Knives from Denmark.

brooches of bronze are very common, they have generally been found in conjunction with iron, and during the Bronze

Age their place seems to have been generally filled by mere pins. Many of the latter articles found in the Swiss lakes appear, however, to have been hair-pins. Some of them are

Fig. 48.



Egyptian Knife.

Fig. 49.

Fig. 50.

Bracelets.—Switzerland.

Fig. 51.

Fig. 52.

Fig. 53.

Fig. 54.

Bronze Hair-pins.—Switzerland.

nearly a foot in length, and two found near Berne even as much as 2ft. 9in. Many of the pins have large hollow

spherical heads, as in figs. 51, 52; the others vary so much that it is impossible to give any general description of them. There can be little doubt that these pins really belong to the Bronze Age; but the fact, that similar ones continued in use long after the introduction of iron, is equally well established. One of these later bronze pins is represented in fig. 171. Some other small objects of bronze, including two needles, from the Lake of Neufchatel, are represented in figs. 55–60. Bronze hammers are very rare; it is probable that stones were used for this purpose. Gouges are more common. Small saws have been discovered in Germany and Denmark, but not, as

FIG. 55. FIG. 56. FIG. 57. FIG. 58.

FIG. 59.

FIG. 60.

Small objects in Bronze.—Switzerland.

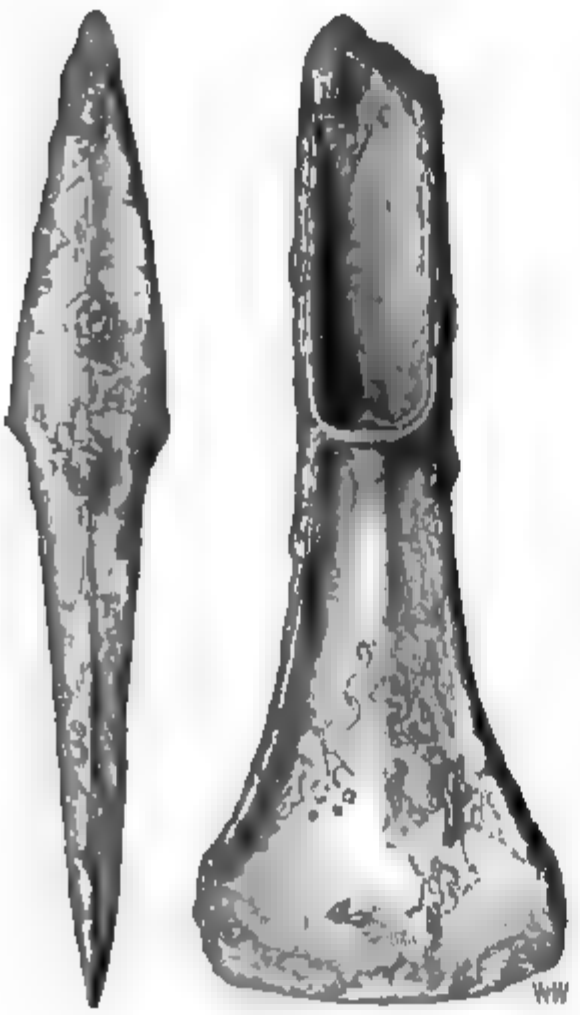
yet, in Great Britain. Studs or buttons, though not very abundant, are found both in Switzerland and Scandinavia *. Silver, lead, and zinc appear to have been unknown during the Bronze Age. Glass beads were in use, but no vessels of glass have yet been discovered; in the same manner there are barbarous tribes now which are well supplied with European beads, but which possess no glass vessels.

The weapons and ornaments of the Bronze Age are all

* Further information as to the objects of bronze from Switzerland will be found in the chapter on the Swiss lake habitations.

cast, and show very considerable skill in metallurgy *. Three modes of casting were employed. One was that in a mould, either of stone or metal. Of course in this case the mould was necessarily in two halves, and the line of junction was generally visible, as in fig. 61, representing a celt, which has evidently been cast in this manner. This specimen was found in Kent, and presented to me by Dr. Dasent. It is clear, however, that such an object as the knife in fig. 40 could not have been cast in this manner. Neither were the pins, figs. 51–54, for if they had been, the line of junction between the two halves of the mould must have been traceable.

FIG. 61.



Kentish Celt.

Indeed this mode of casting was evidently unusual. This is proved by the condition of the objects, by the scarcity of moulds, and also by the fact that we seldom find any two bronze objects exactly similar to one another. Thus, out of the six hundred and eighty-eight specimens in the Dublin Museum, no two were cast in the same mould, clearly showing that the moulds were not permanent.

The second mode of casting was by making a model of the object in wood or some other hard substance, and press-

* See Morlot's interesting memoir: "Sur le passage de l'âge de la pierre à l'âge du Bronze et sur les métaux employés dans l'âge du Bronze." Copenhague, 1866.

ing it on fine sand, so as to obtain a corresponding hollow. The sand must of course have been contained in two boxes or frames, fitting like the solid moulds one on the other. Objects cast in this manner would therefore also show the line of junction. The advantage of this method is that sand can easily be worked into the required form, and wooden models were much more easily made than hollow moulds, either of stone or metal. Like the former, however, this method was applicable to very simple castings only. Specimens in which the line of junction is not exactly central, or symmetrical, were probably cast in this manner, the model having been pressed into the one mould rather more deeply than into the other.

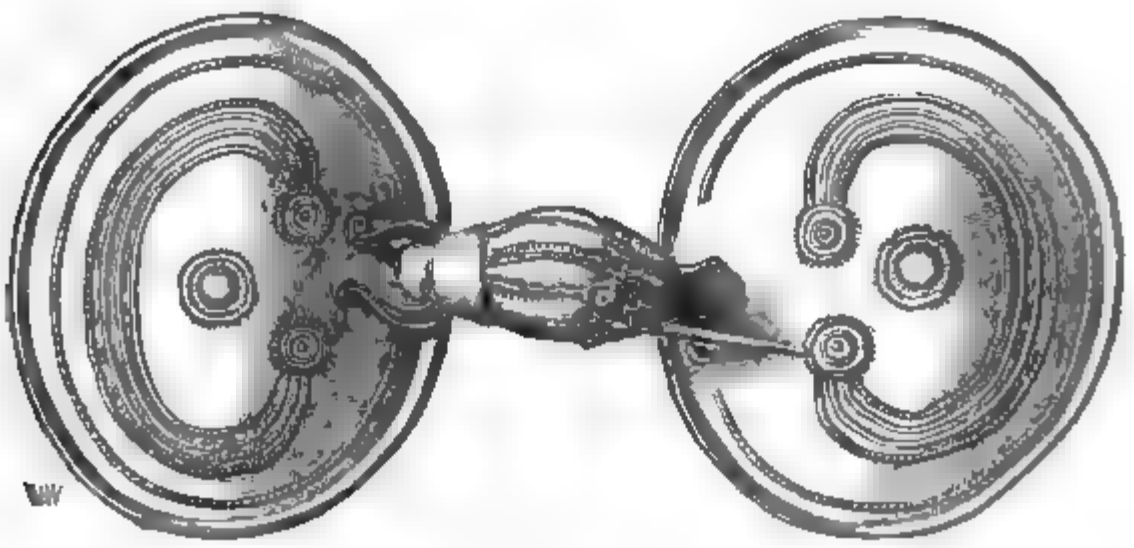
The third method of casting was with wax. In this case, as in the former, a model was made and enclosed in prepared earth, made of some clayey soil mixed probably with cowdung, or some other inflammable substance, in order that when subjected to heat, it might become porous. The frame was then warmed so that the wax melted and ran out of the hole through which the metal was to be poured in. This was the commonest mode of casting during the Bronze Age. It required fewer instruments, and did not, like the other two methods, involve a line of junction, which was a great advantage, because in the absence of steel the projecting ridge thus produced was very difficult to remove, especially when the objects were ornamented. In one case M. Morlot observed on an object of bronze the mark of a finger, evidently resulting from an impression on the soft wax. Occasionally, again, when the wax was heated carelessly, it burned and left a carbonized film, which of course produced a corresponding mark on the object cast.

In some few cases the interiors of bronze vessels show the marks of the spatula with which the wax was worked.

The evidences of imperfect metallurgical knowledge and

appliances are also very interesting. M. Morlot has called attention to a striking instance of this presented by one of the large Schwerin brooches (fig. 62). This was evidently

Fig. 62.



Mended Brooch.—Mecklenburgh.

a *chef d'œuvre*, but the intermediate bow connecting the two great discs had been accidentally broken. In order to mend it again, the two pieces were put into their proper relative position, and the broken bow was covered with a layer of wax. The whole was then surrounded with the usual preparation of clay, etc., the wax was melted out and replaced with bronze.

Fig. 63.

Again, besides the orifice through which the bronze was poured into the mould, it was necessary to leave one or more holes through which the air might escape. The first, being funnel-shaped, was easily removed, but the latter were frequently beaten over, as is seen at the top of fig. 63, for without steel it was almost impossible to cut them off. Indeed the smiths of the Bronze Age seem to have been unable to pierce bronze, and the holes for rivets, as in the swords, etc., are cast and not pierced.

Even the ornamentation in circles, spirals, etc., on the

bronze objects is all cast, and though beautifully drawn, was evidently done with the free hand; compasses seem therefore to have been unknown. Moreover it is evident that these decorated objects must have been cast with wax, for though on a flat surface the line of junction might have been smoothed down, it could not have been obliterated on the ornamented objects.

On some of the bronze vessels, indeed, the ornamentation has been produced by hammering. This, however, indicates a considerable progress in metallurgy.

Soldering seems to have been entirely unknown during the Bronze Age, and even during the earlier times of the Iron Age. Thus the Hallstadt bronze vessels, when broken, were always riveted together.

FIG. 64.

Gold Torque.—Ireland. Found near Clonmacnoise.

I have also figured a group (figs. 64–67) of Irish gold

Fig. 65.

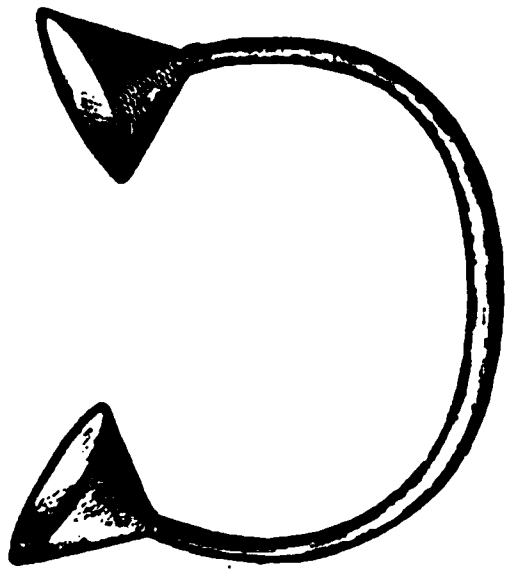
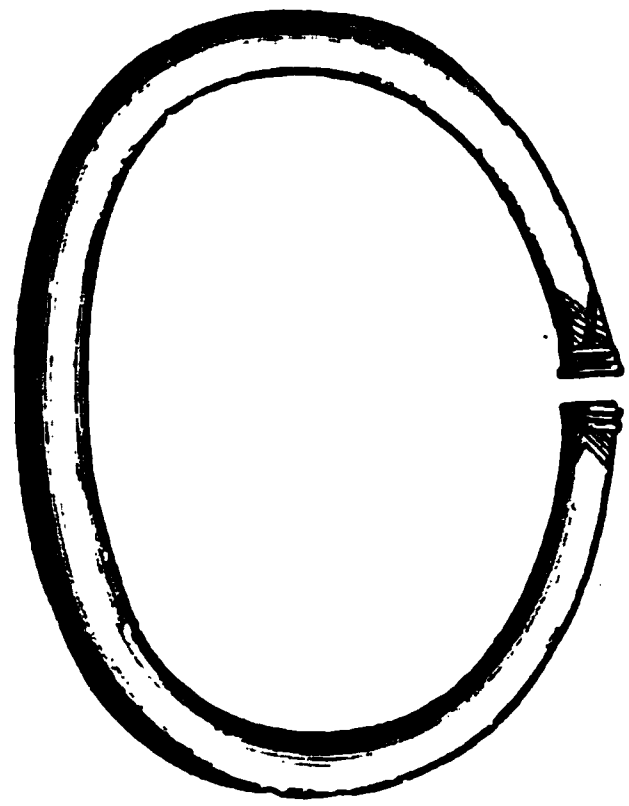
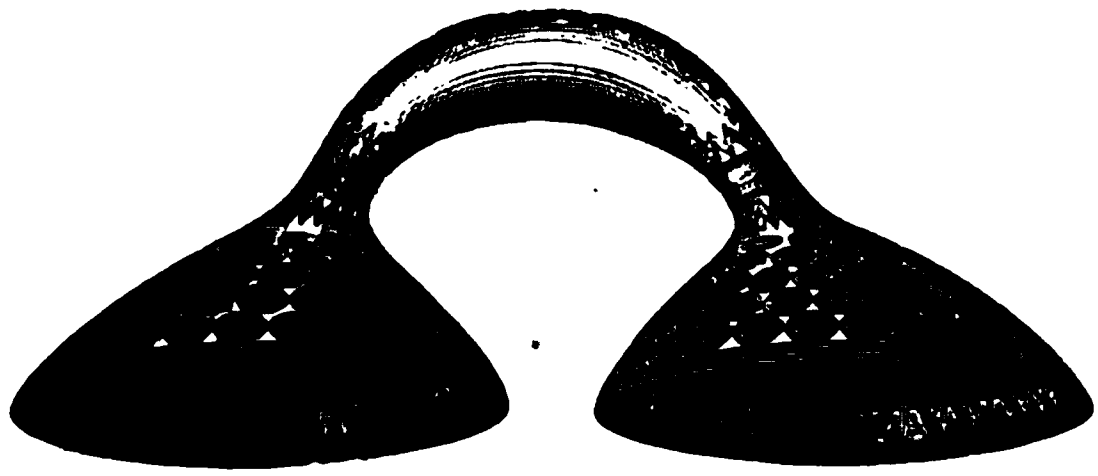


Fig. 66.



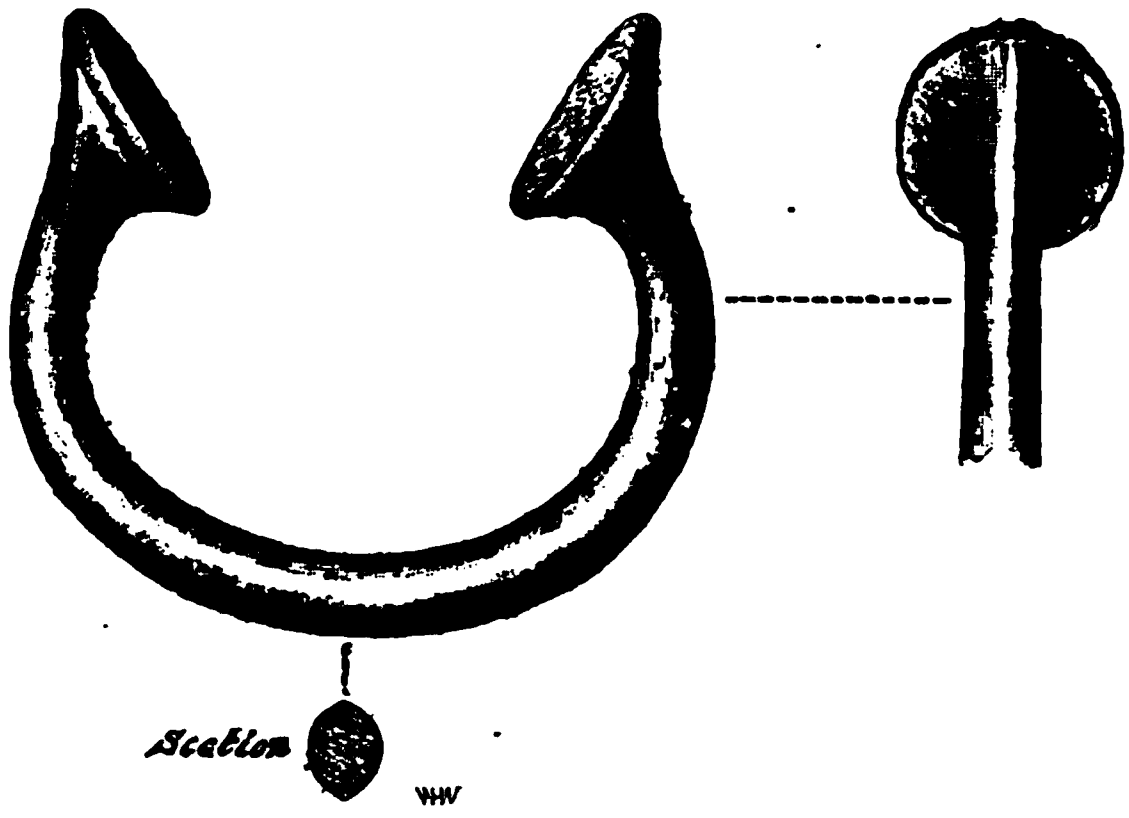
Gold Ornaments.—Ireland.

Fig. 67.



Gold Ornament.—Ireland.

Fig. 67*.



Iron Ornament.—Africa.

	Nidau.	Mœrigen.	Estavayer.	Cortaillod.	Corcelettes.	Auvernier.	Other places.	Total.
Celts and Fragments	23	7	6	13	1	6	11	67
Swords	...	...	...	...	...	...	4	4
Hammers	4	...	1	...	...	...	...	5
Knives and Fragments ...	102	19	14	22	19	8	9	193
Hair-pins	611	53	239	183	237	22	22	1367
Small Rings.....	496	28	115	195	202	14	3	1053
Ear-rings	238	42	36	116	...	3	5	440
Bracelets and Fragments	55	14	16	21	26	11	2	145
Fish-hooks	189	12	43	71	9	2	1	248
Awls	95	3	49	98	17	...	...	262
Spiral Wires.....	...	...	46	50	5	...	...	101
Lance-heads.....	27	7	...	4	2	5	2	47
Arrow-heads	...	...	5	1	...	...	...	6
Buttons.....	...	1	28	10	10	...	...	49
Needles.....	20	2	3	4	1	...	...	30
Various Ornaments.....	15	5	7	18	3	1	...	49
Saws	...	...	3	...	...	...	...	3
Daggers	...	...	...	...	...	...	2	2
Sickles	18	12	1	2	7	1	4	45
Double-pointed Pins	75	...	...	...	...	...	...	75
Small Bracelets	20	...	...	11	...	...	...	31
Sundries	96	3	5	16	...	...	4	124
Total	2004	208	618	835	539	73	69	4346

ornaments. We have, however, as yet no evidence as to their origin, and very probably they belong to a much later period. The fact is interesting that very similar ornaments, made however not of gold, but of iron, are now worn by the natives of Africa. One of these is represented in fig. 67*.

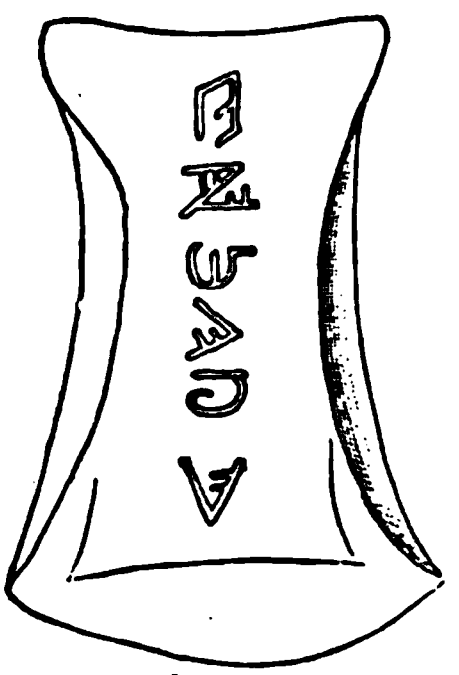
The ornamentation on the objects of bronze is of a peculiar, and at the same time uniform, character; it consists of simple geometrical patterns, and is formed by combinations of spirals, circles, and zigzag lines; representations of animals and plants being very rarely attempted. Even the few exceptions to this rule are perhaps more apparent than real. Thus, two such only are figured in the Catalogue of the Copenhagen Museum; one is a rude figure of a swan (fig. 37), the other of a man (fig. 39). The second of these forms the handle of a knife, which appears to be straight in the blade, a type characteristic of the Iron Age, but rarely found in that of Bronze. As regards one of them, therefore, there is an independent reason for referring it to the period of transition, or at least to the close of the Bronze Age. There is, indeed, one type of pattern, usually found on the razor-knives, but sometimes also on others, intended probably for a rude representation of a ship (figs. 42–45). Even, however, if we admit that this is the case, and if we accept these objects as belonging to the Bronze Age, they will only show how little advance had yet been made in the art of representing natural objects.

The foregoing table, which I owe to the kindness of Dr. Keller, will give an idea of the relative numbers of the different objects.

There is, I believe, only one case in which any bronze weapon or implement bears an inscription; a fact which is the more significant when we remember how often letters are met with on those of iron. Fig. 68 represents this interesting specimen, which is a winged celt, and is in the

Museum Kircherianum of the Jesuits' College at Rome. No explanation of the inscription has yet been given, nor do we even know to what alphabet the letters belong. It was found in the Campagna, but there is unfortunately no record of the circumstances under which it was discovered.

FIG. 68.



Inscribed Celt.

The skill displayed in the manufacture of the objects described in this chapter, as well as the beauty of their form and ornamentation, shows a considerable development of art. The discovery of a bar of tin at Estavayer, and of a mould for casting celts at Morges, has proved that some at least of these objects were made in Switzerland, just as evidence of a similar nature shows that other countries in Europe, as, for instance, Denmark, England, Scotland, and Ireland, had also their own foundries. The similarity of form and ornamentation appears also to indicate some communication between different parts of Europe; but as Cornwall, Saxony, and Spain are the only known European sources from which tin can be obtained in any quantity, the mere presence of bronze is in itself a sufficient evidence not only of metallurgical skill, but also of commercial intercourse.

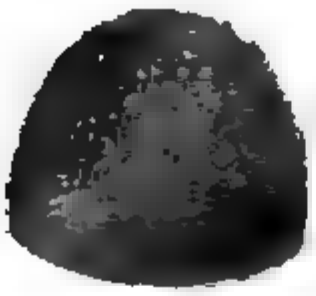
We should hardly, perhaps, have hoped to ascertain much of the manner in which the people of the Bronze Age were dressed. Considering how perishable are the materials out of which clothes are necessarily formed, it is wonderful that any fragments of them should have remained to the present day. There can be little doubt that the skins of animals were extensively used for this purpose, as indeed they have been in all ages of man's history; many traces of linen tissue also have been found in English tumuli of the Bronze Age, and in the Swiss Lakes. Fig. 168 represents a

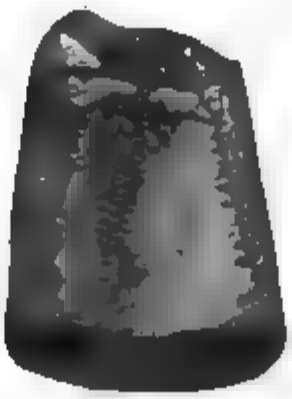
piece of fabric from Robenhausen in Switzerland; it belongs, however, in all probability, to the Stone Age. Even a single fragment such as this, throws much light on the manufactures, if we may call them so, of the period to which it belongs; but fortunately we need not content ourselves with any such partial knowledge as this, as we possess the whole dress of a chief belonging to the Bronze Age.

On a farm occupied by M. Dahls, near Ribe in Jutland, are four tumuli, known as Great Kongehoi, Little Kongehoi, Guldhoi, and Treenhoi. This last was examined in 1861 by MM. Worsaae and Herbst. It is about fifty ells in diameter and six in height, being composed of a loose sandy earth. In it, near the centre, were found three

Fig. 70.

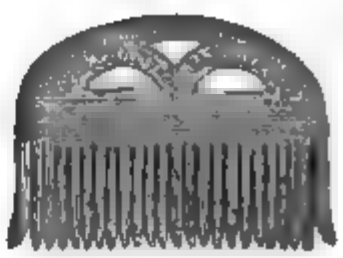
Fig. 69.





Woollen Caps.

Fig. 71.



Comb.

wooden coffins, two of full size, and one evidently intended for a child. The coffin with which we are now particularly concerned, was about 9ft. 8in. long and 2ft. 2in. broad on the outside; its internal measurements were 7½ft. long and 1ft. 8in. broad. It was covered by a movable lid of corresponding size. The contents were peculiar, and very interesting. While, as might naturally be expected, we find, in most ancient graves, only the bones and teeth, all the soft parts having long ago decayed away, in some cases—and this was one of them—almost exactly the reverse has happened. Through the action of water, owing perhaps to the fact that it was strongly impregnated with iron, the soft parts of

Fig. 72.

Woollen Cloak.

Fig. 73.

Woollen Shirt.

Fig. 74.

Woollen Shawl.

the body had been turned into a dark, greasy substance; and the bones, with the exception of a few fragments, were changed into a kind of blue powder.

Singularly enough, the brain seems to have been the part which had undergone least change. On opening the coffin, it was found lying at one end, where no doubt the head had originally been placed, covered by a thick hemispherical woollen cap, about six inches in height (fig. 69). The outer side of the cap was thickly covered by short loose threads, every one of them ending in a small knot, which gave the cap a very singular appearance. The body of the corpse had been wrapped in a coarse woollen cloak (fig. 72), which was almost semicircular, and hollowed out round the neck. It was about 3ft. 8in. long, and broad in proportion. On its inner side were left hanging a great number of short woollen threads, which gave it somewhat the appearance of plush.

On the right side of the body was a box, closed by a lid of the same diameter. It was 7½in. in diameter, 6¼in. high, and was fastened together by pieces of osier or bark. In this box was a similar smaller one, without a lid, and in this, again, were three articles, namely, a cap 7in. high, of simply woven woollen stuff (fig. 70); a small comb 3in. long, 2½in. high (fig. 71); and a small simple razor-knife.

After the cloak and the bark-box had been taken away, two woollen shawls came to view, one of them covering the feet, the other lying nearer to the head. They were of a square shape, rather less than 5ft. long, 3ft. 9in. broad, and with a long fringe (fig. 74). At the place where the body had lain, was a shirt (fig. 73) also of woollen material, cut out a little for the neck, and with a long projecting tongue at one of the upper angles. It was fastened at the waist by a long woollen band, which went twice round the body, and hung down in front. On the left side of the corpse was a bronze

sword (fig. 27), in a wooden sheath. It is 2ft. 3in. in length, and has a solid simple handle.

At the feet were two pieces of woollen stuff, about 14½in. long and 3½in. wide (fig. 75), the use of which does not seem quite clear, though they may be supposed to have been leggings. At the end of the coffin were found traces of leather, doubtless the remains of boots. In the cap, where the head had been, was some black hair, and the form of the brain was still recognizable. Finally, this ancient warrior had been wrapped round in an ox's hide, and so committed to the grave.

FIG. 75.

Leggings.

The other two coffins were not examined by competent persons, and the valuable information which they might have afforded was thus lost to us. The more indestructible things were, however, preserved; consisting of a sword, a brooch, a knife, a double-pointed awl, a pair of tweezers, a large double button or stud, all of bronze; a small double button of tin, and a javelin-head of flint.

The baby's coffin produced only an amber bead, and a small bronze bracelet, consisting of a simple ring of metal.

The "Kongshoi" contained four wooden coffins, in which were bodies clothed in woollen garments, a bronze sword in a wooden sheath ornamented with carvings, two bronze daggers, a wooden bowl ornamented by a large number of tin nails, a vase of wood, and a small box of bark.

There can, therefore, be no doubt that these very interesting tumuli date from the Bronze Age, and I am inclined to place them somewhat late in that period, partly on account of the knife and razor-knife, both of which belong to forms which there are, as already mentioned, other reasons for

referring to the close of the Bronze Age, and to the beginning of that of Iron. Bronze brooches are also very rarely found in the Bronze Age, and are common in that of Iron. The sword, again, belongs to a form which is regarded by Professor Nilsson as being of late introduction.

Finally, the mode of sepulture, though other similar cases are on record, is, to say the least, very unusual; in the age of Iron, indeed, the corpse was generally extended, but in that of Bronze the dead were, with few exceptions, burned, or buried in a contracted attitude. In Denmark, cremation appears to have been almost universal; in England I have taken out the statistics of 100 cases of tombs containing objects of bronze, 37 recorded by Mr. Bateman and 63 by Sir R. C. Hoare; and the following table shows the manner in which the corpse had been treated.

	Contracted.	Burnt.	Extended.	Uncertain.
Bateman..	15	10	5	7
Hoare....	4	49	2	8
	19	59	7	15

In 100 cases recorded by Mr. Greenwell all were contracted and burnt.

We may consider, therefore, that during this period the corpse was sometimes, though very rarely, extended on its back, and more frequently it was buried in a sitting or crouching position, and in a small chamber formed by large stones, but that the most usual practice was to burn the dead, and collect the ashes and fragments of bones in or under an urn.

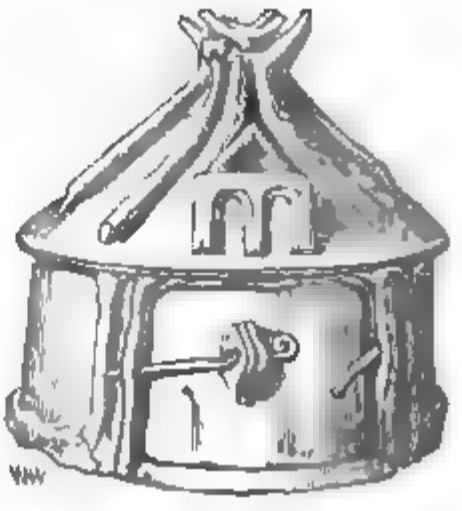
The ancient funeral customs, however, will be more fully considered in a subsequent chapter.

We know as yet very little about the architecture of the Bronze Age. Rougemont* considers that the Round

* L'Age du Bronze, p. 12, 380.

towers belong to that period, but I know no sufficient reason for this opinion. In the next chapter I shall give my reasons for referring some at least of our so-called Druidical remains to that period, and many of the Swiss Lake-villages certainly belong to it. These remains, indeed, give us little information as to the kind of houses then in use. Certain "hut-urns," however, or urns in the form of huts, which have been discovered in Italy and Germany, appear to belong to the close of the Bronze Age. The Italian "hut-urns" were discovered in 1817 * at Albano, near Rome, under an undisturbed layer of peperino or consolidated volcanic ash, and belong, therefore, to a time when the volcanoes near Rome were still in a state of activity. The volume of the Archæologia for 1869 contains a full account by Prof. Pigorini and myself of the numerous vases and other objects found with these hut-urns. The pottery is peculiarly dark and compact, and with it were found several bronze knives. The presence of some fragments of iron, however, appears to show that the huts belong quite to the close of the Bronze Age, or rather to the commencement of that of Iron. The following figure will give an idea of the urns themselves, as well as of the houses they were intended to represent.

FIG. 76.



Hut-urn.—Albano.

These cases are not isolated. In the year 1837 Dr. Beyer found near Parchim a somewhat similar hut-urn in a tumulus, which, both from its form and as containing bronze, is considered by Dr. Lisch as certainly belonging to the Bronze Age †.

* See Lettera del Signor D. A. Visconti sopra alcuni vasi sepolchrali rinvenuti nelle vicinanze della antica Alba-Longa. Roma, 1867.

† Ueber die Hausurnen. Schwerin, 1856.

In 1849 an urn evidently intended to represent a house with a tall straw roof, was found in a tumulus at Aschersleben. From its colour and material Dr. Lisch refers this urn also to the Bronze Age.

FIG. 77.

Urn apparently representing a Lake-dwelling.

The Museum at Munich contains a very interesting piece of pottery (fig. 77), apparently intended to represent a Lake-hamlet comprising seven small round huts. The huts are arranged in three rows of three each, thus forming three sides of a square. The fourth side is closed by a wall, in the centre of which is an opening leading into a porch, which is represented as being thatched. The platform on which the huts stand, is supported by four columns represented as consisting of logs, lying one upon the other. The roof is unfortunately wanting. The sides are ornamented with the double spiral so characteristic of the Bronze Age.

In North Germany and Denmark also urns have been discovered somewhat resembling that in fig. 76. In these cases the "door" is in the roof. Dr. Lisch considers that these last urns are the earliest, and represent a form of dwelling even more ancient than those in which the door is in the side. To me, I confess, it seems more probable that these urns belong to a later period, when the representation of the dwelling was more conventional, and the resemblance consequently less.

Many of the dwellings in use during the Bronze Age were no doubt subterranean or semi-subterranean. On almost all large tracts of uncultivated land, ancient villages of this

character may still be traced. A pit was dug, and the earth which was thrown out formed a circular wall, the whole being then probably covered over with boughs. The "Penpits," near Gillingham, in Wiltshire, are of this character, and indicate a populous settlement. In Anglesea, similar hut-circles have been well described by the Honourable Owen Stanley*. On Dartmoor and elsewhere, where large blocks of stone abounded, the natives saved themselves the trouble of excavating, and simply built up circular walls of stone. In other cases, probably when concealment was an object, the dwellings were entirely subterranean. Such ancient dwellings are in Scotland known as "weems," from "Uamha," a cave. In one of these at Monzie, in Perthshire, a bronze sword was discovered†. Such underground chambers, however, appear to have been used in Scotland as dwellings, or at least as places of concealment, down to the time of the Romans; for a weem described by Lord Rosehill‡ was constructed partly of stones "showing the diagonal and diamond markings peculiar to Roman workmanship." The so-called Picts' houses, which are so common in the north of Scotland, are but slightly, and often not at all, sunk beneath the surface, though, being covered with earth, they are scarcely distinguishable externally from the larger tumuli: but on digging into the green mound, it is found to cover a series of large chambers, built generally with stones of considerable size, and converging towards the centre, where an opening appears to have been left for light and ventilation. These differ little from many of the subterranean weems, excepting that they are erected on the natural surface of the soil, and have been buried by means of an artificial mound heaped

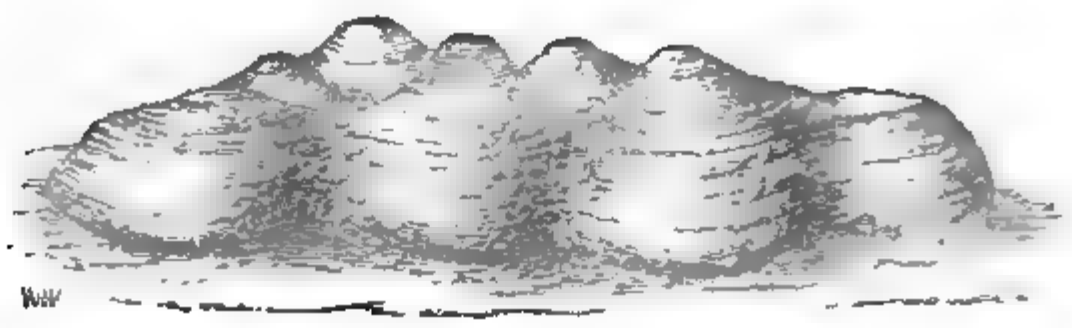
* On Remains of the Ancient Circular Habitations in Holyhead Island. By the Hon. W. O. Stanley, M.P.

† Wilson, Pre-Historic Annals of Scotland, vol. i. p. 104.

‡ Lord Rosehill, Proc. of the Soc. of Ant. of Scotland, 1869, p. 109.

over them. It may seem improbable that a people living in such rude dwellings should possess a knowledge of metallurgy, but the Kaffirs and other existing African tribes present us with a similar case.

Fig. 78.



Group of Beehive Houses.—Scotland.

From these we pass naturally to the beehive houses, which are constructed of dry, thick walls in the form indicated by the name*. No doubt many of these are very ancient, and some probably date from the Age of Stone; but on the other hand they also come down to the present day, and fig. 78 represents a group in Long Island, on the shore of Loch Resort, which was inhabited down to the year 1823. Even now some few beehive houses are still occupied in the Island of Uig.

Fig. 79.

The Burgh of Mousa.

* See Capt. Thomas on Beehive Houses, Proc. Soc. Antiq. Scotland, vol. iii. p. 133; vol. vii. p. 153. See also Petrie, Proc. Soc. Antiq. Scotland, vol. vii. p. 201.

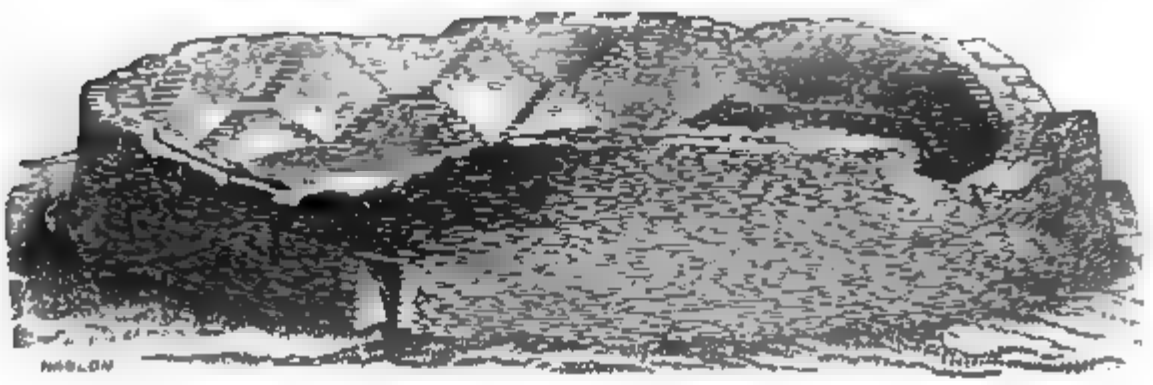
The celebrated "brochs" or "burghs" which abound in the north of Scotland, as well as in the Orkneys and Shetlands, are of a very peculiar character. They have been supposed by some to be Scandinavian, but no similar buildings occur in Norway, Sweden, or Denmark, so that this style of architecture is no doubt anterior to the arrival of the Northmen.

Fig. 79 is copied from a photograph of the celebrated Burgh of Moussa, in the Shetlands, the best preserved specimen of this curious style of architecture. I visited this most interesting building in 1867. It stands close to the sea on the little island of Moussa. It is circular in form, 41 feet in height, and open at the top; the central space is about 20 feet in diameter, and the walls are about 14 feet thick at the base and 8 at the top. They contain a staircase, which leads to the top of the building, several horizontal galleries, and some small conical chambers, all opening on the inside; the only external orifice being the door, which is about 7 feet high.

The absence of trees and abundance of stone probably led to this curious style of architecture. Although, moreover, so archaic in character, these burghs continued in use down to historical times, in fact until the introduction of lime, and the knowledge of the true principle of the arch, enabled the natives to construct buildings of a more modern character; these burghs are extremely numerous in Caithness, in the Orkneys and the Shetlands, but this Moussa Burgh is one of the few that are mentioned in history. Torfœus tells us that about the year 1150 Erling carried off the beautiful Margaret, mother of Harold, the then Earl of Orkney, and was besieged in Moussa by Harold, who, however, being unable to take the place, at length thought it politic to consent to the marriage. By far the greater number of the burghs are mere ruins, and the so-called Dun of Dornadilla,

supposed to have been erected by the ancient Scotch King of that name, is the only one which is at all as complete as that of Moussa. Whether any of the burghs go back to the Bronze Age it is impossible to say. It is remarkable, however, that in the Island of Sardinia there are archaic buildings known as "nurhags," which very closely resemble the British burghs.

Fig. 80.



Staigue Fort.—Kerry.

In a future chapter I shall endeavour to show that Stonehenge and Abury belong to the Bronze Age. Some of the ancient fortifications also probably are of this period, but a large proportion, as for instance the Staigue Fort, in the county of Kerry, fig. 80, belong in all probability to a much later period.

CHAPTER III.

THE BRONZE AGE.

THERE are four principal theories as to the Bronze Age. According to some archæologists, the discovery, or introduction, of bronze was unattended by any other great or sudden change in the condition of the people; but was the result, and is the evidence, of a gradual and peaceable development. Some attribute the bronze arms and implements, found in Northern Europe, to the Roman armies, some to the Phœnician merchants; while others, again, consider that the men of the Stone Age were replaced by a new and more civilized people of Indo-European race, coming from the East; who, bringing with them a knowledge of bronze, overran Europe, and dispossessed—in some places entirely destroying—the original, or rather the earlier inhabitants.

M. Wibel * believes that the civilization of the Bronze Age originated in the South of England, from whence it spread over other parts of Europe. He is also of opinion that the ancient bronze was obtained, not by the fusion of copper and of tin, but directly from ore containing the two metals. This, I confess, seems to me extremely improbable †, and I cannot but agree with those who maintain that the knowledge of bronze must necessarily have been preceded by the separate use of copper and of tin. Yet no single implement of the latter metal has been hitherto found in Europe, while those

* Die Cultur der Bronze-zeit Nord- und Mittel-Europas. Dr. F. Wibel, Kiel.

† See Appendix.

of copper are extremely rare; Hungary and Ireland, indeed, have been supposed to form partial exceptions to this rule. The geographical position of the former country is probably a sufficient explanation; and as far as Ireland is concerned, it may perhaps be worth while to examine how far that country really forms an exception. In the great Museum at Dublin there are 725 celts and celt-like chisels, 282 swords and daggers, and 276 lances, javelins, and arrow-heads; yet out of these 1283 weapons only 30 celts and one sword-blade are said to be of pure copper*. I say "are said to be," because they have not been analyzed, but are supposed to be copper only from the "physical properties and ostensible colour of the metal:" indeed one of these very celts, which *was* analyzed by Mr. Mallet, was found to contain a small percentage of tin. It is possible that for some of the purposes to which celts were applied, copper may have been nearly as useful as bronze, and at any rate it might sometimes have happened that, from a deficiency of tin, some implements would be made of copper only.

Taking these facts into consideration, Ireland certainly does not appear to present any strong evidence of an age of copper, while no one has ever pretended to find either there, or any where else in Europe, a trace of any separate use of tin †.

Sir W. R. Wilde admits it to be "remarkable that so few antique copper implements have been found, although a knowledge of that metal must have been the preliminary stage in the manufacture of bronze." He thinks, however, that "the circumstance may be accounted for, either by supposing that but a short time elapsed between the knowledge of smelting and casting copper ore, and the introduction of

* One even of these is with good reason considered by Dr. Wilde to be an American specimen.

† It was sometimes used for purposes of ornamentation, but that of course does not affect the present argument.

tin, and subsequent manufacture and use of bronze; or from the probability of nearly all such articles having been recast and converted into bronze, subsequent to the introduction of tin, which renders them harder, sharper, and more valuable*."

Any argument used by Sir W. R. Wilde is of course entitled to respectful attention, but on the whole, the absence of implements made either of copper or tin seems to me to indicate that the art of making bronze was introduced into, not invented in, Europe.

Another circumstance which strongly militates against the theory of a gradual and independent development of metallurgical knowledge in different countries, is the fact which has been broadly stated by Mr. Wright, that whenever we find the bronze swords or celts, "whether in Ireland in the far west, in Scotland, in distant Scandinavia, in Germany, or still farther east in the Sclavonic countries, they are the same—not similar in character, but identical." The great resemblance of stone implements found in different parts of the world may be satisfactorily accounted for by the similarity of the material, and the simplicity of the forms. But this argument cannot be applied to the bronze arms and implements. Not only are several varieties of celts found throughout Europe, but some of the swords, knives, daggers, etc., are so similar, that they seem as if they must have been cast by the same maker. Compare, for instance, figs. 4, 6, and 13, which represent Irish celts, with, 14, 15, and 16, which are copied from Danish specimens; the three swords, figs. 22, 23, and 24, which come respectively from Ireland, Sweden, and Switzerland, and the two, figs. 25 and 26, of which the first is Swiss, the second Scandinavian. It would have been easy to multiply examples of this similarity, and it is not going too far to say that these resemblances cannot

* Wilde, *l.c.* p. 357.

be the result of accident. On the other hand, it must be admitted that each country has certain minor peculiarities. Neither the forms nor the ornaments are exactly similar. In Denmark and Mecklenburgh, spiral ornaments are most common; farther south, these are replaced by ring ornaments and lines. The Danish swords generally have solid, and richly decorated handles, as in figs. 25–31, while those found in Great Britain (fig. 22) terminate in a plate which was riveted to pieces of wood or bone. Again, the British lance-heads frequently have loops at the side of the shaft-hole, as in fig. 35, which is never the case with Danish specimens.

The impurities in the bronze indicate, as was shown in the last chapter, that the copper ore was not all derived from one locality, and, lastly, the discovery of moulds in Ireland, Scotland, England, Switzerland, Denmark, and elsewhere, proves that the art of casting in bronze was known and practised in many countries. Under these circumstances it appears most probable that the knowledge of metal is one of those great discoveries which Europe owes to the East, and that the use of copper was not introduced into our Continent until it had been observed that by the addition of a small quantity of tin it was rendered harder and more valuable.

I have already, in the first chapter, given the reasons which have convinced me that the bronze weapons are not of Roman origin. M. Wiberg* has recently attempted to show that bronze was introduced into the north by Etrurian merchants, but we have not, I think, any evidence that Etruria ever enjoyed so extensive a commerce as that indicated by the great number of bronze objects which have been found in northern and western Europe.

We may, therefore, pass on to the views of those who attribute the Bronze Age civilization to the influence of

* Arch. f. Anthrop. 1870, p. 10.

Phœnician commerce, a theory which has recently been maintained, with great ability, by Professor Nilsson *. Sir George Cornewall Lewis †, on the other hand, while admitting that Cornwall was the great source of tin in ancient times, has endeavoured to prove that this metal found its way "to the nations in the east of the Mediterranean by the overland route across Gaul, and that the Phœnician ships brought it from the mouth of the Rhone, without sailing as far as Britain."

He regards, therefore, the accounts of ancient voyages as being in many cases either mythical, or at least exaggerated, but he does not make sufficient allowance for the fact that our knowledge of them is often derived from unfriendly critics or poetical allusions; nor need we go farther than Sir Cornewall Lewis' own work to show how authors may suffer by this mode of treatment ‡.

Take, for instance, the case of Himilco, who was sent during the prosperous times of Carthage to examine the north-western coasts of Europe. His writings have unfortunately perished, and our knowledge of them derived from the "Ora maritima," a geographical poem by Avienus, is thus summed up by Sir Cornewall Lewis: "The report of Himilco, that the voyage from Gades to the Tin Islands (i. e. to Cornwall) occupied at least four months; and that navigation in these remote waters was impeded by the motionless air, by the abundance of seaweed, and by the monsters of the deep—*fables* which the ancient mariners recounted of unexplored seas—would not be very attractive for the traders of the Carthaginian colonies." This argu-

* Skandinaviska Nordens Ur-invanare. Af. S. Nilsson, Stockholm, 1862.

† An Historical Survey of the Astronomy of the Ancients. By the Right Hon. Sir George Cornewall Lewis, 1862.

‡ In the long chapter which he devoted to the Egyptian Chronology and Hieroglyphics, the name of Dr. Young is not once mentioned.

ment is surely very weak, because, if Himilco really did make this voyage, then such voyages were possible; and, on the other hand, if he did not do so, and if his statements were such mere fables, we may safely assume that the shrewd merchants of Carthage would detect the imposition, and would extract the truth, if not from Himilco himself, at any rate from some of those by whom he was accompanied.

But let that pass; we will examine the four "fables" specially referred to by Sir G. C. Lewis. It is unnecessary to say any thing about the "motionless air;" it would be doing an injustice to Sir Cornewall Lewis to suppose that he regarded this as a serious objection. It may be an invention, but it is not an improbability. Neither is the time occupied by an exploring expedition any test of that which would be required for a commercial voyage. Nor can I lay any stress on the statement that Himilco's vessels were "impeded" by the monsters of the deep. What Avienus really said was, as Sir Cornewall Lewis admits in another passage, that while becalmed and lying in a helpless state, the ships were "surrounded by marine monsters*." It might fairly be argued that whales were in all probability more numerous on our coasts in ancient times than they are now; the great mammalia of the sea, as well as those of the land, have given way before the overwhelming power of man. But it is unnecessary to urge this hypothesis; the great monsters of the deep have in all ages appealed strongly to the imagination of mankind, and no poet would fail to allude to them in describing the dangers which beset those "who go down to the sea in ships, and occupy their business in great waters."

The third point alluded to by Sir Cornewall Lewis, so far from throwing any doubt on the veracity of Himilco, appears rather to be an argument in his favour. His ships, he says,

* See Appendix.

or at least Avienus says for him, were "surrounded by sea-weed." Where was he when this took place? All that we can say in answer to this question is, that he sailed through the Pillars of Hercules into the Atlantic Ocean, and we know that a few days' sail in this direction would have brought him to the "Mare di Sargasso," a sea which has actually taken its name from the quantity of seaweed (Sargasso) growing in it. Sir C. Lewis says, "The notion of remote seas being impassable by ships, either from their shoals, or from the obstacles to navigation produced by the semi-fluid and muddy properties of the water, frequently recurs among the ancients;" and it is true, no doubt, that statements of this kind are made by many ancient writers, as, for instance, by Herodotus, Plato, Scylax, and even Aristotle; but not one of these writers alludes to "seaweed" as an impediment to navigation, and it can hardly be accidental, that the only voyager by whom this is referred to, was one who sailed on a course which, if persevered in for a few days, would have brought him to that which is even now known as the Sea of Seaweed *.

Pytheas is another ancient writer, whose character has suffered very much in the hands of Sir C. Lewis, who, relying on the authority of Polybius and Strabo, does not hesitate to stigmatize him as a mendacious impostor. Polybius doubts the journeys of Pytheas, because Pytheas was a poor man; but the great travellers and explorers of the present day do not generally belong to our wealthy families. Strabo seems to have been prejudiced against Pytheas, because he professed to have visited countries which ought, according to Strabo's theory, to have been uninhabitable. Moreover, we should remember that the first travellers in the

* May not the belief in the "Atlantis" be as probably owing to the "gulf-weed," which would so naturally suggest the idea of sunken land, as to any of the other causes which are usually assigned for it?

North must have seen, and on their return would describe, many things which would appear impossible or incomprehensible to dwellers on the sunny shores of the Mediterranean. Sir C. Lewis refers specially to four incredible assertions made by Pytheas. First, he is said to have related that "if any person placed iron in a rude state at the mouth of the volcano in the island of Lipari, together with some money, he found on the morrow a sword or any other article which he wanted, in its place." This, however, merely shows that the myth of Valand, Wielant, Weland, or in our popular dialect, Wayland Smith, was current in the Lipari islands at the time of Pytheas*. This myth, moreover, is but a very slightly modified account of what actually has taken place more than once when an ignorant people, living by the side of a more civilized race, and attributing their superiority to magical arts, has been anxious to benefit by their necromancy, and yet afraid to come in contact with the magicians themselves. Thus "the Veddahs of Ceylon, when they wanted arrows, used to bring some flesh in the night, and hang it up in a smith's shop, also a leaf cut in the form they will have their arrows made, and hang by it; which if the smith do make according to their pattern, they will acquite and bring him more flesh†." If our knowledge of this peculiar mode of barter had been derived from the Veddahs, it would undoubtedly have taken the form of the

* On this interesting subject, see Wright. Archæol. vol. xxxii. p. 315.

† Knox's Historical Relation of the Island Ceylon. London, 1681. Quoted in the Ethnological Society's Trans. vol. ii. p. 285, N.S. See also Sir J. E. Tennent's Ceylon, vol. i. p. 593. The Belgian form of the myth as related by Schmerling (Ossements fossiles, vol. i. p. 43) still more closely resembles the account given by Knox. Speaking of the caves near Liege, he says: "Ces ouvertures sont connues des habitans de l'endroit sous le nom de Trous des Sottais. Ils prétendent que jadis ces grottes servaient d'habitation à une espèce humaine d'une très petite taille, Sottais, nains, pygmées, qui y vivaient de leur industrie, et restauraient tout ce qu'on déposait près des ouvertures, à condition *que l'on y ajoutât des vivres*. En très peu de temps ces effets étaient réparés, et remis à la même place."

old European myth. The metallurgists of old, to preserve their monopoly, evidently had a great interest in keeping up this superstition.

Sir Cornewall Lewis, in the second place, accuses Pytheas of having described the sea round the Lipari islands as being in a boiling state. But we do not know what his exact words were, and cannot fairly judge him, for it makes a great difference whether he was repeating a statement made to him, or making one on his own authority. Moreover, we must remember that there have been submarine eruptions in the Mediterranean, and that the Lipari islands lie between Mount Etna and Vesuvius, in the very centre of an active volcanic area. These two mountains, which for the last two thousand years have been more or less frequently in eruption, seem to have enjoyed a long period of rest, during which the Lipari islands served as a vent. It seems to me therefore highly probable that this statement made by Pytheas was a perfectly truthful record of an actual occurrence.

The third difficulty is the assertion, that round the island of Thule, Pytheas saw a substance which was neither earth, air, nor water, but a substance resembling medusæ or jelly-fishes (*πνεύμονι θαλασσίῳ ἐοικὸς*), which could neither be passed on foot nor in ships. This passage, which has completely puzzled southern commentators, is regarded by Professor Nilsson as a striking evidence of Pytheas' veracity. For when the northern ocean freezes, this does not happen as in our ponds or lakes, but small, separate plates of ice are formed, and as soon as this process commences, the fishermen hurry to the shore, lest they should be caught in the ice, which for some time is too thick to permit the passage of a boat, yet too weak to support the weight of a man. A very similar description is given by Captain Lyon. "We came," he says, "amongst young ice, in that state called

sludge, which resembles in appearance and consistency a far better thing—lemon ice. From this we came to small round plates, of about a foot in diameter, which have the appearance of the scales of gigantic fishes *." Richardson also particularly mentions the "circular plates of ice, six or eight inches in diameter†." These discs of ice tossed about by the waves suggested to Professor Nilsson himself, when he first saw them, the idea of a crowd of medusæ, and if we imagine a southerner who had never before witnessed such a phenomenon, and who on his return home wished to describe it to his fellow-countrymen, it would have been difficult to find an apter or more ingenious simile. It is, at any rate, not more far-fetched or less appropriate than that used by Herodotus, when, in order to describe a heavy snow-storm, he compared it to a fall of feathers.

"Fourthly," says Sir C. Lewis, "Pytheas affirmed that in returning from his great northern voyage, in which he first obtained accounts of the remote island of Thule, he had sailed along the entire coast of the ocean between Gadeira and the Tanais; that is from Cadiz round Spain, Gaul, Germany, and Scythia, to the river Don, which was considered by the ancients as the boundary of Europe and Asia. This statement furnishes an additional proof of the mendacity of Pytheas, because it is founded on the belief, received in his time, that Europe did not project far to the North, and that the Ocean swept along its shores to the north of Scythia and India." Pytheas, however, did not, in reality, lay himself open to any such accusation; the passage on which Sir C. Lewis relies only affirms that *after* his return from the north (*ἐπανελθὼν ἐνθένδε*) he travelled along the whole coast of Europe from Cadiz to the Don. This, which evidently refers to a second journey, is a very different statement, and one which I see no reason to doubt.

* Lyon's Journal, p. 84. † Arctic Expedition, vol. ii. p. 97.

According to Geminus, Pytheas in his northern journey reached a place where the nights were only two or three hours long, and he adds that the Barbarians took him to see the place where the sun slept. These two statements seem to point to Dönnäs as the northernmost point of his voyage. Here the shortest night is two hours long, but behind the town is a mountain, the top of which is the southernmost point from which the midnight sun can be seen. The inhabitants took Professor Nilsson here in the year 1816, to show him the place where the sun rested, just as their predecessors may have conducted Pytheas to the same spot, for the same purpose, more than 2000 years before. On this subject I will only add that Pytheas was no mere wanderer, but a distinguished astronomer, who, with the help of the gnomon only, estimated the latitude of Marseilles at 43° 17′ 8″, a calculation which differs merely by a few seconds from the result given by modern astronomers—namely, 43° 17′ 52″.

I have dwelt at some length on this part of my subject, for while we are all anxious to pay due honour to our modern travellers, to Livingstone and Galton, to Speke and Grant, we ought not to forget those who led the way. The memory of great men is a precious legacy, which we cannot afford lightly to surrender, and not the least valuable part of Professor Nilsson's work on the Bronze Age is the chapter in which he has rescued the memory of Pytheas from the cloud by which it has been so long and so unjustly obscured.

But even if Sir Cornewall Lewis could have established his case, and destroyed our faith in these particular expeditions, still there remain overwhelming proofs of an important and extended commerce in even more ancient times than those of Pytheas or Himilco. The evidence of this has been well put together by Dr. Smith*, of Camborne, to whose work I would refer those who may wish for more detailed informa-

* The Cassiterides, by George Smith, LL.D.

tion; for the present I must content myself with referring to a few well-known facts, which, however, will be sufficient for my present purpose.

We know, then, that Marseilles was founded by the Phocean Greeks B.C. 600; Carthage is supposed to have been built by the Phœnicians about 800 B.C.; and Utica, according to Strabo and Pliny, about 300 years earlier still; while, according to Velleius Paterculus and Pomponius Mela, the city of Gades (Cadiz) was founded by the Tyrians not long after the fall of Troy. Before such facts as these, the supposed improbability of Pytheas' voyage to Norway falls to the ground. The distance between Cadiz and Phœnicia is more than 2000 miles, and it is greater than that between Cadiz and Norway. Even, therefore, if Pytheas effected all that has been claimed for him, he will not have made a longer voyage than hundreds of his countrymen had done, a thousand years before.

The above-given dates must not, of course, be considered as exact, but there is no reason to doubt their general accuracy. Not only do the writings of Hesiod and Homer, which are probably not of a later date than 800 B.C., and probably somewhat earlier, show that the nations on the eastern shores of the Mediterranean were at that time highly civilized, and had a considerable commerce, but we have very valuable evidence of the same fact in the Biblical narrative. Indeed, brass, i. e. bronze, is mentioned in the fourth chapter of Genesis, which would be, according to the chronology of the established version, 3875 B.C.; but there is so much doubt about these dates, that I do not feel disposed to rely on this isolated passage. The high civilization of Egypt in the time of Joseph is, however, apparent to every reader of the book of Exodus. Again, when Solomon prepared to build the temple in Jerusalem, he sent unto the king of Tyre for cedar-trees out of Lebanon, "for thou knowest," he said, "that

there is not among us any that can skill to hew timber like unto the Sidonians" (1 Kings v. 6); and again we read, (*l. c.* vii. 13, 14) that "King Solomon sent and fetched Hiram out of Tyre. He was a widow's son of the tribe of Naphtali, and his father was a man of Tyre, a worker in brass: and he was filled with wisdom, and understanding, and cunning to work all works in brass." It is admitted that the word which here, and in so many other passages, is translated "brass," should rather be "bronze." This latter, which was the common metal of antiquity, is never mentioned in our version, while on the other hand, the alloy which we now term brass, and which is composed of copper and zinc, was not known in ancient times.

Now this bronze, which from the wholly independent statements of Homer and in the Book of Kings, we find to have been so abundant in the East three thousand years ago, was composed of copper and tin, in the proportions of about nine parts of the former to one of the latter; and the question therefore arises, whence were these metals obtained?

Copper is found in so many countries, that we cannot, as yet, form any definite opinion as to the source, or sources, from which it was derived by the Phœnicians. Nevertheless, we have some reason to hope and expect that we shall eventually be able to do so, because the slight impurities by which it is accompanied afford a clue to the country from which it was obtained. As regards tin, the case is very different; although ores of this metal are found in other countries, as for instance in France, in Portugal, in Saxony, in Spain, and in Siberia, still almost all the tin now used is derived either from Cornwall, or from the island of Banca, which lies between Sumatra and Borneo. In ancient times a certain amount of tin was no doubt obtained in Spain *,

* See Howarth, Trans. Ethn. Soc. 1867, p. 80. See also Appendix.

but, as Dr. Smith observes*, "the most remarkable feature in tin mining seems to be the enduring character of the mines. Wherever tin has been produced in any considerable quantities, within the range of authentic history, there it is still abundantly found. In Banca, we are told, the supply is inexhaustible; and Cornwall can now supply as large a quantity annually as it ever could." The result of inquiries made of the Government Engineers, at the College of Mines in Madrid, is as follows: "I cannot learn that Spain ever produced any quantity of this metal. The Government do not work any mines of tin. The quantity being produced at present is very small, chiefly by streamers; or rather labourers, while out of their regular employment, search some of the rivers near the granite hills in Galicia and in Zamora. I cannot learn that there is any tin mining in the country."

Unless, then, the ancients had some source of tin with which we are unacquainted, it seems to be well established, and is indeed admitted even by Sir Cornewall Lewis, that the Phœnician tin was mainly derived from Cornwall, and, consequently, that even at this early period a considerable commerce had been organized, and very distant countries brought into connexion with one another. Sir C. Lewis, however, considers that the tin was "carried across Gaul to Massilia, and imported thence into Greece and Italy." Doubtless, much of it did in late times come by this route, but the Phœnicians were in the plenitude of their power 1200 years B.C., while Massilia was not built until 600 B.C. Moreover, Strabo expressly says that in early times the Phœnicians carried on the tin trade from Cadiz, which we must remember was nearer to Cornwall than to Tyre or Sidon.

We are, therefore, surely quite justified in concluding that between B.C. 1500 and B.C. 1200, the Phœnicians were already

* The Cassiterides, p. 45.

acquainted with the mineral fields of Spain and Britain; and, under these circumstances, it is, I think, more than probable that they pushed their explorations still farther, in search of other shores as rich in mineral wealth as ours. Indeed, we must remember that amber, so much valued in ancient times, could not have been obtained from any nearer source than the coast of the German Ocean.

M. Morlot thinks that he has found traces of the Phœnicians even in America, while Professor Nilsson has attempted, as already mentioned, to show that they had settlements far up on the northern shores of Norway. M. Morlot relies on some antiquities, and particularly on certain glass beads, found in American tumuli; these, however, in the opinion of Mr. Franks, may be mediæval, and of Venetian origin. Professor Nilsson's arguments may be reduced to seven, namely, the small size of the sword-handles, bracelets, etc.; the character of the ornaments on the bronze implements; the engravings in Bronze Age tumuli; the worship of Baal; certain peculiar methods of reaping and fishing; and the use of war-chariots.

The implements and ornaments of bronze certainly appear to have belonged to a race with smaller hands than those of the present European nations; the ornaments on them are also peculiar, and have, in Professor Nilsson's opinion, a symbolic meaning. Although the great stones in tumuli attributed to the Bronze Age are very seldom ornamented, or even hewn into shape, still there are some few exceptions; one of these being the remarkable monument near Kivik in Christianstad. From the general character of the engravings Professor Nilsson has no hesitation in referring this tumulus to the Bronze Age, and on two of the stones are representations of human figures, which may fairly be said to have a Phœnician, or Egyptian appearance.

On another of the stones an obelisk is represented, which

Professor Nilsson regards as symbolical of the Sun-God; and it is certainly remarkable that, in an ancient ruin in Malta *, characterized by other decorations of the Bronze Age types, a somewhat similar obelisk was discovered; we know also, that in many countries Baal, the God of the Phœnicians, was worshipped under the form of a conical stone.

Nor is this, by any means, the only case in which Professor Nilsson finds traces of Baal worship in Scandinavia. Indeed, the festival of Baal, or Balder, was, he tells us, celebrated on Midsummer's night in Scania, and far up into Norway, almost to the Loffoden Islands, until within the last fifty years. A wood fire was made upon a hill or mountain, and the people of the neighbourhood gathered together in order, like Baal's prophets of old, to dance round it, shouting and singing. This Midsummer's-night fire has even retained in some parts the ancient name of "Baldersbal," or Balders-fire. Leopold von Buch long ago suggested, that this custom could not have originated in a country where at Midsummer the sun is never lost sight of, and where, consequently, the smoke only, not the fire, is visible. A similar custom also prevailed until lately in some parts of our islands. Baal has given his name to many Scandinavian localities, as, for instance, the Baltic, the Great and Little Belt, Belteberga, Baleshaugen, Balestranden, etc.

The ornamentation characteristic of the Bronze Age, is, in the opinion of Professor Nilsson, decidedly Semitic rather than Indo-European. He lays considerable stress on two curious vase-carriages, one found in Sweden and the other in Mecklenburg, which certainly appear to have been very like the "vases" made for Solomon's temple, and described in the first Book of Kings. Finally, he believes that the use of war

* For an account of the ruins of Hagiar Kem, see Furse. Trans. Int. Congress of Pre-hist. Archæol. 1868, p. 407, or Dr. Adams' Archæol. and Nat. Hist. of the Nile Valley, and the Maltese Islands.

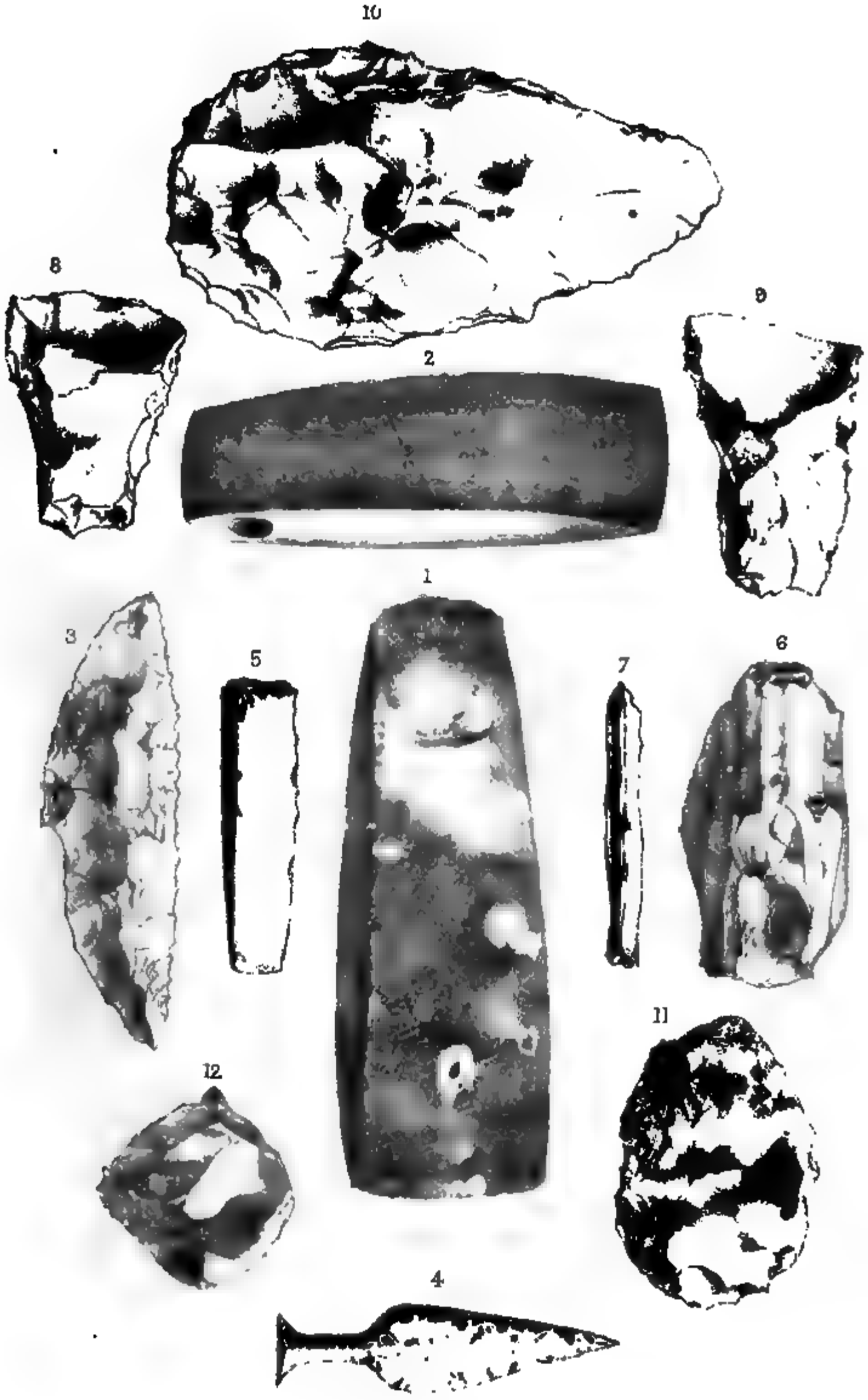
chariots, the practice of reaping close to the ear, and a certain method of fishing, are all evidences of Phœnician intercourse.

Professor Nilsson is so great an authority, as an archæologist his labours have contributed so much to place the science on a sound basis, that his opinions are deserving of the most careful consideration. Nor can they fairly be judged by the very short abstract which has been given above, as many of his arguments must be followed in detail before they can be properly appreciated. That the Phœnicians have left their traces in Norway is, however, in my opinion, all that can fairly be deduced from the facts on which he relies, even if we attribute to them all the significance claimed for them by him. Further evidence is required before it would be safe to connect them with the Bronze Age. As regards the smallness of the hands, we must remember that Hindoos share this peculiarity with Egyptians; this character is therefore not less reconcilable with an Indo-European than with a Phœnician origin of the Bronze Age civilization.

There are three strong objections to the theory so ably advocated by Professor Nilsson. The first is the character of the ornamentation on the bronze weapons and implements. This almost always consists of geometrical figures, and we rarely, if ever, find upon them representations of animals or plants; while on the ornamented shields, etc., described by Homer, as well as in the decoration of Solomon's temple, animals and plants were abundantly represented. Secondly, the burial customs of the Phœnicians differed altogether from those of the Bronze Age, and although it may be said that those who attribute the presence of bronze in Northern and Western Europe to Phœnician commerce, do not necessarily, on that account, assume that the population of those countries became Phœnician, still in this case the hypothesis explains the presence of bronze but not the Bronze Age, of which the use

of bronze, though the most striking, is by no means the only characteristic. Thirdly, the Phœnicians, so far as we know them, were well acquainted with the use of iron; in Homer we find the warriors already armed with iron weapons, and the tools used in preparing the materials for Solomon's temple were of this metal. It is very remarkable that scarcely any traces of ancient commerce have been found in Cornwall, and it is much to be regretted that our museums possess so few specimens of Phœnician art. When these wants shall have been supplied, as we may hope that ere long they will be, there is no doubt that much light will be thrown on the subject.

The form of the head also would be very instructive; but owing to the habit of burning the dead which prevailed at that period, we have, as yet, very few skulls which can safely be referred to the Bronze Age. On the whole, then, though there is, I think, ample evidence to prove that the general use of bronze weapons and implements characterizes a well-marked epoch in history, it must also be admitted that we have still very much to learn in regard to this interesting phase in the development of European civilization, and the race by whom the knowledge of metals was introduced into our Continent.



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CHAPTER IV.

THE USE OF STONE IN ANCIENT TIMES.

THE preceding chapters have been devoted to the Age of Bronze. We must now pass on to still earlier times and ruder races of men; to a period which, for obvious reasons, is called by archæologists the Stone Age.

The Stone Age, however, falls naturally, as has been already stated, into two great divisions.

First. That of the Drift, which I have proposed to call the Palæolithic or Archæolithic period.

Secondly. The later Stone Age, for which I have suggested the term Neolithic, and in which the stone implements are more skilfully made, more varied in form, and often polished. We will now consider this later period, reserving the earlier for a subsequent chapter.

The immense number of stone implements which occur, in all parts of the world, is sufficient evidence of the important part they played in ancient times. M. Herbst has favoured me with the following list of the numbers contained in the Copenhagen Museum :—

Flint axes and wedges	1070
Broad chisels	285
Hollow ditto	270
Narrow chisels	365
Hollow ditto	33
Poniards	250
Lance-heads	656

Arrow-heads	171
Half-moon shaped implements . . .	205
Pierced axes and axe-hammers . . .	746
Flint flakes	300
Sundries	489
	4840
Rough stone implements from the Kjökkenmöddings	3678
Bone implements	171
Ditto from Kjökkenmöddings. . . .	109
	8798

These figures refer to the year 1864, and if duplicates and broken specimens were counted, he thinks that the number would have been between 11,000 and 12,000. He has also had the kindness to estimate for me the numbers in private and provincial museums, and, on the whole, he believes we shall be within the mark if we consider that the Danish Museums contained 30,000 stone implements, to which, moreover, must be added the rich stores then at Flensborg and Kiel, as well as the very numerous specimens with which the liberality of the Danish archæologists has enriched other countries, for there is scarcely any important collection in Europe which does not possess some illustrations of the Danish stone implements.

The museum of the Royal Irish Academy includes nearly 700 flint flakes, 512 celts, more than 400 arrow-heads, and 50 spear-heads, besides 75 "scrapers," and numerous other objects of stone, such as slingstones, hammers, whetstones, querns, grain-crushers, etc. Again, the museum at Stockholm is estimated to contain between 15,000 and 16,000 specimens.

Yet the very existence of a Stone Age is, or has lately been, denied by some eminent archæologists. Thus Mr.

Wright, the learned Secretary of the Ethnological Society, while admitting that "there may have been a period when society was in so barbarous a state that sticks or stones were the only implements with which men knew how to furnish themselves," doubts "if the antiquary has yet found any evidence of such a period." And though the above figures are sufficient to prove that stone was at one time used for many implements which we now make of metal, this is not in itself a conclusive answer to Mr. Wright, nor in fact would it be denied by that gentleman. Moreover, there is no doubt that in early ages stone and metal were used at the same time, the former by the poor, the latter by the rich.

If we consider the difficulties of mining in early days, the rude implements with which men had then to work, their ignorance of the many ingenious methods by which the operations of modern miners are so much facilitated, and, finally, the difficulties of carriage either by land or water, it is easy to see that bronze implements must always have been very expensive.

In addition, moreover, to the *à priori* probability, there is plenty of direct evidence that bronze and stone were in use at the same time. Thus Mr. Bateman records thirty-seven instances of tumuli which contained objects of bronze, and in no less than twenty-nine of these stone implements also were found. At the time of the discovery of America, the Mexicans, though well acquainted with the use of bronze, still used flakes of obsidian for knives and razors, and even after the introduction of *iron*, stone was still used for various purposes.

Still, however, there appears to be enough evidence to justify us in believing, not only that there was a period "when society was in so barbarous a state that sticks or stones" (to which we must add horns and bones) "were the only implements with which men knew how to furnish them-

selves," but also that the antiquary has found clear "evidence of such a period." Part, at least, of this evidence will be found in the following pages; and though it is true that much of it has been obtained since our accomplished countryman published the work from which I have just quoted, yet he has repeated his previous statements in a lecture subsequently delivered at Leeds.

Our knowledge of this ancient period is derived principally from four sources, to the consideration of which I propose to devote four separate chapters: namely, the tumuli, or ancient burial-mounds; the Lake habitations of Switzerland; the Kjökkenmöddings, or shell-mounds, of Denmark; and the Bone-caves. There are, indeed, many other remains of great interest, such, for example, as the ancient fortifications, the "castles" and "camps" which crown so many of our hill-tops, and the great lines of embankment, such as Offa's dyke and the Wans-dyke, which cross so many of our uplands; there are the so-called Druidical circles and the vestiges of ancient habitations; the "Hut-circles," "Clog-hauns," "Weems," "Penpits," "Picts' houses," etc. The majority of these belong, however, in all probability, to a later period; and at any rate, in the present state of our knowledge, we cannot say which, or how many of them, are referable to the Stone Age.

As far as the material is concerned, every kind of stone, which was hard and tough enough for the purpose, was used during the Stone Age in the manufacture of implements. The magnificent collection of celts at Dublin has been specially studied, from a mineralogical point of view, by the Rev. S. Haughton, and the results are thus recorded by Wilde*:—

"Of the better qualities of rock suited for celt-making, the type of the felspathic extreme of the series of trap rocks is the pure felstone, or petrosilex, ... of a pale blueish

* Catalogue of the Royal Irish Academy, p. 72.

or grayish green, except where the surface has been acted upon, and the average composition of which is 25 parts quartz and 75 felspar. Its physical characters are absence of toughness, and the existence of a splintery conchoidal fracture almost as sharp as that of flint. . . . . At the hornblendic extreme of the trap rocks we find the basalt, of which also celts were made; tough and heavy, the siliceous varieties having a splintery fracture, but never affording so cutting an edge as the former. . . . . Intermediate in character between these two rocks, we find all the varieties of felstone, slate, and porphyry streaked with hornblende, from which the great majority of the foregoing implements have been made."

It is very remarkable how carefully the best kinds of stone were selected even when very rare. Of this the most interesting example is afforded by the axes, etc., of Jade. These, though far from common, are not very rare, having been found in many of the Swiss lake-villages, in various parts of Italy, France, Germany, and England, although Jade itself is not known to occur in any part of Europe. It was supposed by some archæologists that it might have been obtained from the conglomerate known in Switzerland as the "Nagelflue," but the most careful investigations have not confirmed this view*. I do not think it would yet be safe to conclude that these Jade axes were introduced from the East; but no European locality for Jade has yet been discovered, and it is perfectly possible that they may have passed from hand to hand, and from tribe to tribe, by a sort of barter. Other facts of a similar nature are on record. Thus Messrs. Squier and Davis tell us that in the tumuli of the Mississippi valley we find "side by side, in the same mounds, native copper

* See Damour, Comptes Rendues, 1865, p. 359. Fellenberg. Soc. des Sciences Naturelles de Berne, 1865. Fischer, Archiv. f. Anthropologie, 1867, p. 337.

from Lake Superior, mica from the Alleghanies, shells from the Gulf, and obsidian (perhaps porphyry) from Mexico." Good representations of the sea-cow or manatee are found a thousand miles from the shores inhabited by that animal, and shells of the large tropical *Pyrula perversa* are found in the tumuli round the great lakes, two thousand miles from home.

On the whole, however, flint appears to have been the stone most frequently used in Europe, and it has had a much more important influence on our civilization than is generally supposed. Savages value it on account of its hardness and mode of fracture, which is such that, with practice, a good sound block can be chipped into almost any form that may be required.

In many cases blocks and pebbles of flint, picked up on the surface of the ground, were used in the manufacture of implements; but in other cases much labour was spent to obtain flint of good quality. A good illustration of this is afforded by the so-called Grime's Graves, near Brandon, one of which has recently, by the kind permission of Mr. Angerstein, been explored by Mr. Greenwell*. Much difference of opinion has existed among archæologists as to the true nature of the graves, but the question has now been set at rest by Mr. Greenwell, who has shown that they were excavations made in the chalk for the purpose of obtaining flint. They are shallow pits, 254 in number, varying in diameter from 20 to 60 feet, placed irregularly, generally about 25 feet apart, and occupying rather more than 20 acres. Although now comparatively shallow, Mr. Greenwell has proved that the pits originally went down to a depth of 39 feet, when they branch out into passages, often communicating with one another. On the east side of the pits is a mound, apparently consisting of the chalk taken from the first pit; after which it appears that when a new pit was dug,

* Trans. Ethn. Soc. 1870, p. 419.

most of the material was thrown down the old shafts, which were thus filled in to within a few feet of the surface. As usual in the Upper Chalk, the flint is disposed in layers, which differ in quality, while maintaining the same character over considerable areas. It may be remarked that, as Mr. Flower has well pointed out*, Brandon, "though situated in a bleak and barren district, has evidently been a place of considerable resort from a very remote period—a circumstance which can only be attributed to the abundance and good quality of the flint found there." Palæolithic implements abound in the drift gravels, the surface is strewn with flint flakes and fragments of flint implements, and at the present time it is the only place in England where gun-flints are still made. For this purpose one particular layer of flint is found to be peculiarly well adapted, on account of its hardness and fineness of grain, while another layer, which is less suitable for gun-flints, is known as "wall stone," being much used for building purposes. Now it is interesting to find that, even in very early times, the merits of the gun-flint layer were well known and appreciated; for although there is abundance of flint on the surface, the ancient flint-men sank their shafts down past the layer of "wall stone," which occurs at a depth of 19½ feet, to the gun-flint layer, which at the spot in question is 39 feet deep, although about a mile to the S.W., where it is now worked, it is much nearer the surface.

At present the workmen excavate the chalk both above and below the layer of flint; but in the old galleries, perhaps from the greater difficulty of raising the material, the chalk below the flint bed was in no case removed. The implements used in making these excavations were deer's horns, the brow tine being used as a pick, and the others removed. Thus treated, a deer's horn closely resembles in form a modern

* Trans. Ethn. Soc. 1870, p. 437.

pick, but of course it is subject to rapid wear by use, which accounts for the large numbers of worn-out implements found by Mr. Greenwell among the rubbish.

In one case the roof of a passage had given way. On removing the chalk which had fallen in, the end of the gallery came in view. The flint had been hollowed out in three places, and in front of two of these recesses, pointing towards the half-excavated stone, were two deer-horn picks, lying just as they had been left, still coated with chalk dust, on which was in one place plainly visible the print of the workman's hand. They had evidently been left at the close of a day's work; during the night the gallery had fallen in, and they had never been recovered.

"It was a most impressive sight," says Mr. Greenwell, "and one never to be forgotten, to look, after a lapse, it may be, of 3000 years, upon a piece of work unfinished, with the tools of the workmen still lying where they had been placed so many centuries ago."

Similar deer-horn picks have been found in other localities where chalk has been worked for flint, and also in the Cornish Tin Stream Works*. Near Spiennes also, in Belgium, there are extensive workings for flint, consisting of a system of shafts and galleries, very like those of Grimes' Graves, which have been described by MM. Briart, Cornet, and Houzeau de Lehaie†, many tools of deer's horns have been obtained, but they are of a very different character, having been apparently used as hammers, the horn being cut off just above the brow tine, which served as a handle.

In addition to the deer-horn picks, a few adze-shaped tools of flint have been discovered in Grimes' Graves, and a basalt hatchet, in form resembling that represented in fig. 97, but with an oblique cutting edge, the marks of which were

* See, for instance, Rep. of the Roy. Inst. of Cornwall, 1871, p. xxii.

† Mem. de la Soc. des Sciences, des Arts, &, du Hainaut, 1866-7.

distinctly seen upon the sides of the gallery, showing that it had been used in excavating the chalk.

As already mentioned, it was very desirable in the manufacture of flint implements, to have the flint of a good quality, free from cracks and flaws, and easily accessible. Hence, places which fulfilled these conditions were specially frequented in ancient times, and whole districts were supplied from these favoured localities. One of the most remarkable of these manufactories is that discovered by Dr. Leveillé at Pressigny-le-Grand, in France, about half-way between Tours and Poitiers. Here there is an abundance of good flint of a honey colour, and even, though coarse, texture. This flint was largely used in ancient times: the fields are covered with nuclei, flakes, etc., and implements made here, and easily recognizable by the peculiar colour, have been found in various parts of France, and even, it would seem, in Belgium. I have in my collection a block of Pressigny flint, from which a flake more than twelve inches in length has been struck. The large nuclei of this form, which from their shape are known as "livres de beurre," have excited a good deal of discussion. They are generally from eight to thirteen inches in length, shaped more or less like a boat, with a broad butt at one end, tapering gradually to the other. The form has been attained by a succession of lateral chips, at right angles to the longer axis, while generally one or more longitudinal flakes have also been removed.

At first sight they certainly suggest the idea that they are early stages in the manufacture of large axes, or some similar instruments, and from their form it has even been suggested that they may have been intended to serve as ploughshares. On the comparison of a large number, however—and I have had the opportunity of examining many hundreds—it will be observed that we never meet with specimens in a more

advanced state of manufacture, as would certainly have been the case if this hypothesis were correct. Again, some of them have an original depression in the flint, very much reducing the thickness. This would weaken them so greatly as to render such specimens useless for implements; flints of such a form would certainly, therefore, not have been selected, if strength had been any object. On the other hand, such irregularities would have been no disadvantage, if the "livres de beurre" were nuclei prepared with some degree of care, in order to give long and regular flakes. Long flint flakes were much in demand during the Stone Age for the manufacture of spear heads, etc., and these "livres de beurre" appear to have been the blocks or nuclei from which they were obtained.

Many of the flakes were certainly never intended to serve as knives, but were worked up into saws, awls, or arrow heads. Many savages use flint or chert, in this manner, even at the present day; and the Mexicans in the time of Cortez used precisely similar fragments of obsidian.

The operations of modern gun-flint makers give us a very clear insight into the mode of manufacture of the ancient flint implements, and the process is one of considerable interest.

If we take a rounded hammer, and strike with it on a flat surface of flint, a conoidal fracture is produced; the size of which depends, in a great measure, on the form of the hammer. The surface of fracture is propagated downwards through the flint, in a diverging direction, and thus embraces a cone, whose apex is at the point struck by the hammer, and which can afterwards be chipped out of the mass. Flint cones, formed in this way, may sometimes be found among heaps of stones broken up to mend the roads, and have doubtless often been mistaken for casts of fossil shells.

If a blow is given, not on a flat surface, but at the angle

of a more or less square flint, the fracture is at first semi-conoidal or nearly so, but after expanding for a short distance, it becomes flat, and may be propagated through a length of as much as thirteen inches, thus forming a blade-like flake (figs. 82–89), with a triangular cross section (fig. 90). The consequence is, that a perfect flint flake will always have a small bulb, or projection (fig. 83 *a*) at the butt end, on the flat side; this has been called the

Fig. 82. Fig. 83. Fig. 84.

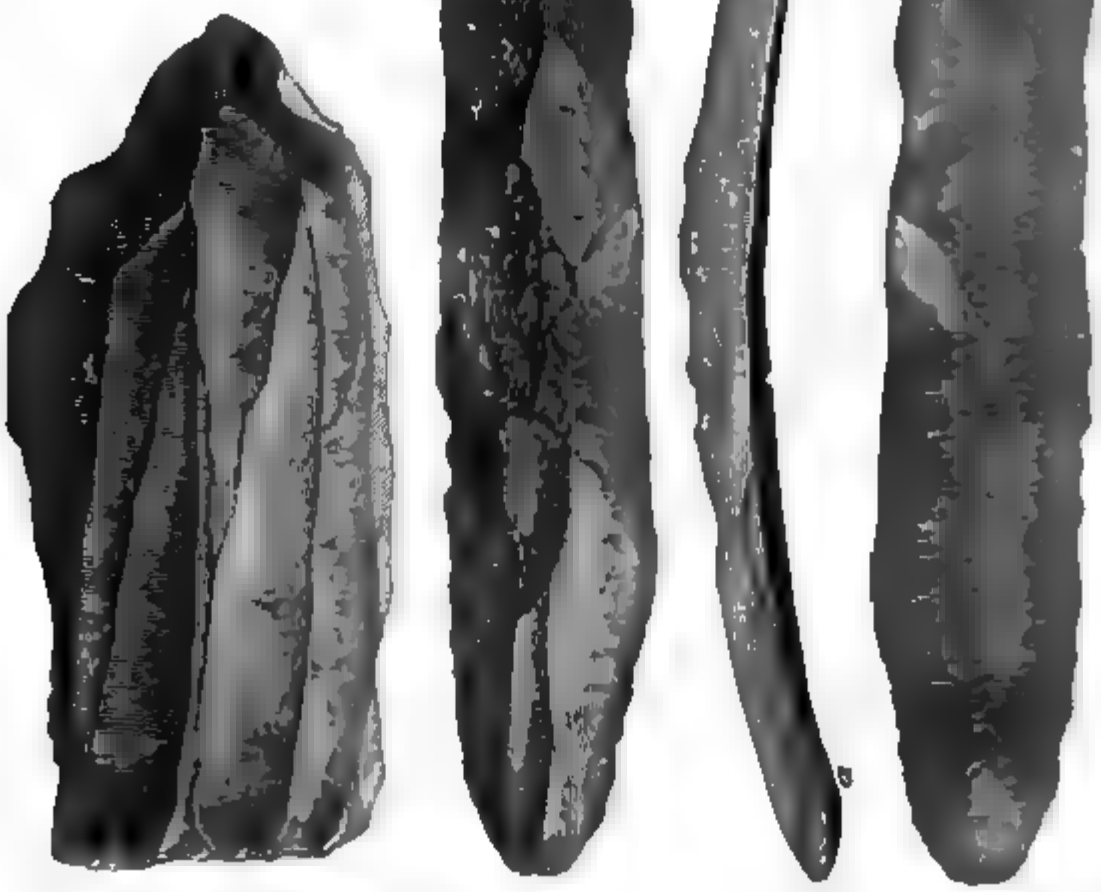


Fig. 81.

Flint core or nucleus.

Flint Flakes.—Denmark.

bulb, or cone, of percussion. After the four original angles of a square block have been thus flaked off, the eight new angles may be treated in a similar manner, and so on. Fig. 81, and pl. 1, fig. 6, represent blocks, or cores, from which

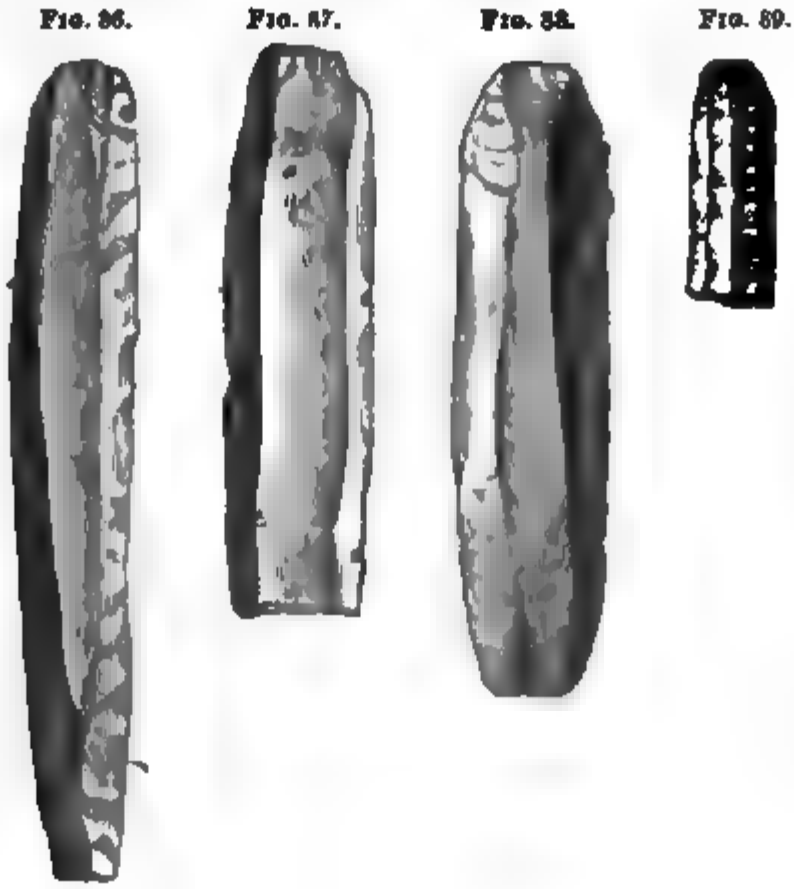
flakes have been struck off. A flake itself is represented in pl. 1, fig. 7, and a very long one from Fannerup in Jutland is figured, one-half of the natural size, in figs. 82, 84. The

Fig. 85.

Arrow-shaped Flint Flake.—Ireland.

bulb is shown in figs. 83 *a* and 84, and the flake has been worked into a point at the end. The largest flake I am

Fig. 86. Fig. 87. Fig. 88. Fig. 89.



Flint Flakes.—Denmark.

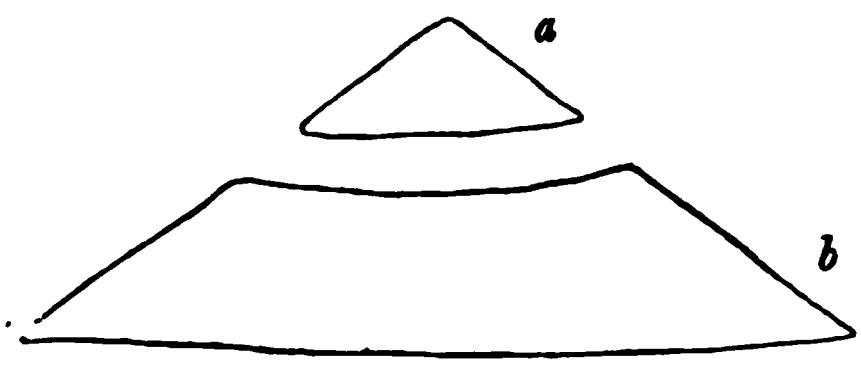
acquainted with is described by M. de Caneto, in the Revue de Gascoyne, for 1865. It was found in the commune of Pauilhaic, and is 13½ inches in length. Fig. 85 is an arrow-

shaped flake chipped away at the base, apparently to adapt it to a handle or shaft.

Figs. 86–89 are small Danish flakes: forms exactly similar may be found in any country where the ancient inhabitants could obtain flint or obsidian. In fig. 86 we see that another flake had been previously taken from the same block. Figs. 86, 88, represent flakes of which the points have been broken off, but we see along their whole length the depression caused by the previous removal of other flakes. The section of such a flake is, therefore, not triangular, as in fig. 98 *a*, but four-sided, as in fig. 90 *b*. Sometimes, though not often, a wide flake is taken off in such a way as to overlap two previous flakes, as in the case of the one represented in fig. 89. In this instance, the section is pentagonal; the flat under-surface remaining always the same, but the upper side showing four facets.

Easy as it may seem to make such flakes as these, a little practice will convince any one who attempts to do so, that a certain knack is required, and a gun-flint maker at Brandon told me that it took him two years to acquire the art. It is also necessary to be careful in the selection of the flint. It is therefore evident that these flint flakes, simple as they may appear, are always the work of man. To make one, the flint must be held firmly, and then a considerable force must be applied, either by pressure or by blows, repeated three or four times, but at least three, and given in certain slightly different directions, with a certain definite force; these conditions could scarcely occur by accident, so that, simple as it may seem to the untrained eye, a flint flake is to the antiquary as sure a trace

Fig. 90.



Sections of Flakes.

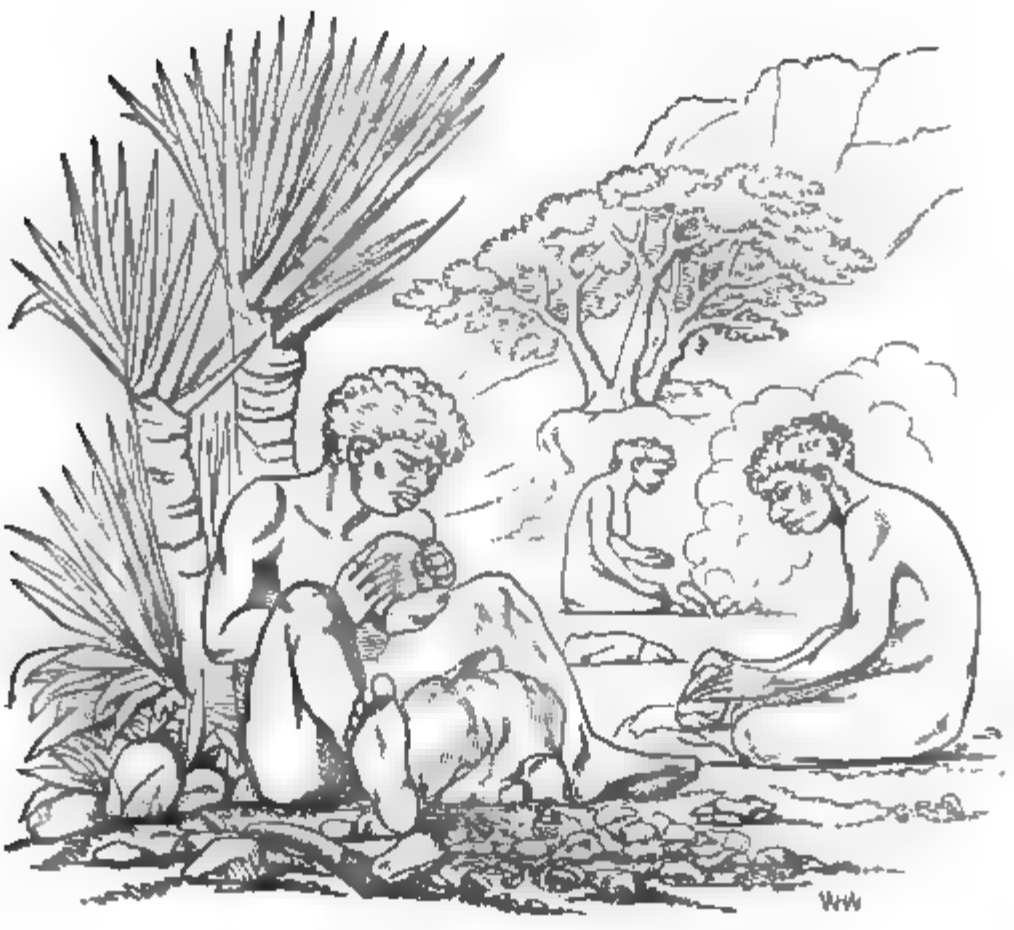
of man, as the footprint in the sand was to Robinson Crusoe.

It is hardly necessary to say, that the flakes have a sharp cutting edge on each side, and might therefore be at once used as knives, as in fig. 91, which represents a North American two-bladed knife: they are indeed so named by

Fig. 91.

North American Knife.

Fig 92.



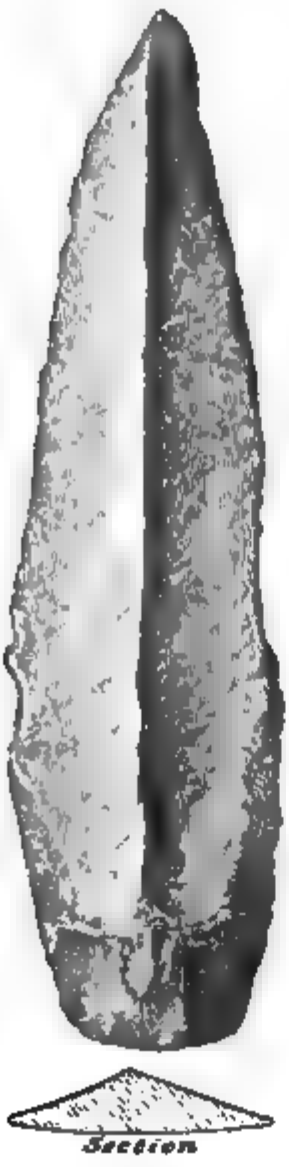
Australians making flakes.

some archæologists; but it seems to me more convenient to call them simply flakes, and to confine the name of knife to implements more especially intended and adapted for cutting purposes. Fig. 92, from a drawing by Mr. Baines *,

* See Geol. and Nat. Hist. Repertory, No. 13, May, 1866.

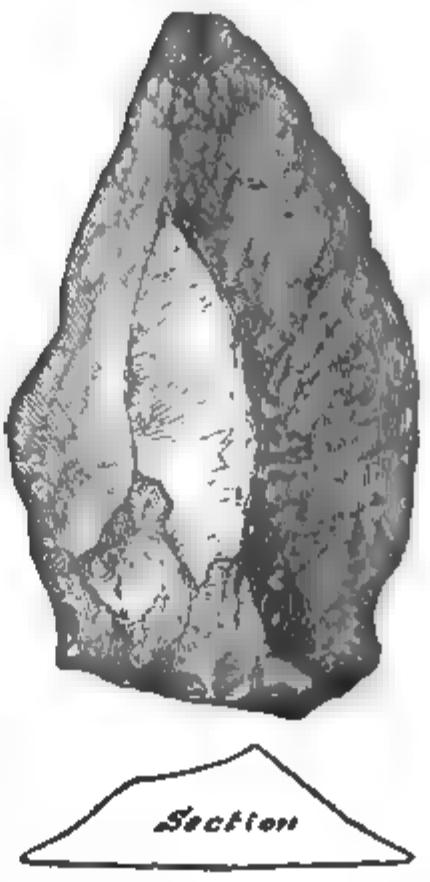
represents an Australian making rude flakes. Fig. 93 represents an Australian flake, and fig. 94, one from the Cape of Good Hope. Figs. 95, 96, represent a new Caledonian javelin, with an obsidian flake (fig. 96) for a head.

Fig. 93.



Australian Flake.

Fig. 94.



Flake from the Cape of Good Hope.

Some of the old Spanish writers in Mexico give us a description of the manner in which the Aztecs obtained their obsidian flakes. Torquemada *, who is confirmed by Hernandez, tells us—I quote from Mr. Taylor's Anahuac—"they had, and still have, workmen who make knives of a certain block stone or flint (obsidian), which it is a most wonderful

* Torquemada, Monarquia Indiana. Seville, 1615.

Fig. 95. F 96.

New Caledonian Javelin.

and admirable thing to see them make out of the stone; and the ingenuity which invented this art is much to be praised. They are made and got out of the stone (if one can explain it) in this manner: one of these Indian workmen sits down upon the ground, and takes a piece of this black stone, which is like jet, and as hard as flint —and is a stone which might be called precious, more beautiful and brilliant than alabaster or jasper, so much so, that of it are made tablets and mirrors. The piece they take is about eight inches long, or rather more, and as thick as one's leg, or rather less, and cylindrical; they have a stick as large as the shaft of a lance, and three cubits or rather more in length, and at the end of it they fasten firmly another piece of wood, eight inches long, to give more weight to this part; then pressing their naked feet together, they hold the stone as with a pair of pincers, or the vice of a carpenter's bench. They take the stick (which is cut off smooth at the end) with both hands, and set it well home against the edge of the front of the stone (*y ponenlo avesar con el canto de la frente de la piedra*), which also is cut smooth in that part; and then they press it against their breast, and with the force of the pressure there flies off a knife, with its point and edge on one side, as neatly as if one were to make them of a turnip with a sharp knife, or of iron in the fire. Then they sharpen it on a stone, using a hone to give it a very fine edge; and in a very short time

these workmen will make more than twenty knives in the aforesaid manner. They come out in the same shape as our barbers' lancets, except that they have a rib up the middle and have a slight graceful curve towards the point."

Thus it appears that the obsidian flakes were made, not by blows, but by strong pressure; and the same is the case with the chert implements of the Esquimaux, according to the description given by Sir E. Belcher*. "Selecting," he says, "a log of wood in which a spoon-shaped cavity was cut, they placed the splinter to be worked over it, and by pressing gently along the margin vertically, first on one side, then the other, as one would set a saw, they splintered off alternate fragments, until the object, thus properly outlined, presented the spear or arrow-head form, with two cutting serrated sides." A very similar account is also given by Lieutenant Beckwith of the method used by the North American Indians†.

Next to flint flakes, the axes, wedges, or celts, are, perhaps, of most importance. The largest and finest specimens are found in Denmark; one in my possession, of beautiful white flint, is 13in. long, 1½in. thick, and 3½in. in breadth. The Seeland axes have very often, indeed generally, perpendicular sides; in Jutland a large proportion have sloping sides; this is also generally the case in other parts of North-Western Europe. In Switzerland, however, the axes, which are much smaller than those from Denmark, have perpendicular sides (fig. 164). The common Danish axe or wedge is figured in pl. 1, fig. 1. Figs. 97 and 98 represent forms which, though rare in Seeland, are common in other parts of Europe. Those found in Denmark are sometimes polished, but almost, if not quite, as often left rough. On the contrary, in other parts of North-Western Europe, the axes are usually ground to a

* Trans. of the Ethnological Soc. New Series, vol. i. p. 138.

† Report of the Explorations and Surveys of the Pacific Railroad, 1855, vol. ii. p. 43.

more or less smooth surface. That some were held in the hand is evident, but that others were fixed in wooden handles is equally clear, in many specimens, from peculiar polished spaces, which have been produced by the friction of the wood. In almost all cases, the wooden handle has long perished, but there are one or two instances on record, in which it has been preserved. Fig. 99 represents a stone hatchet, found, some years ago, in the County of Monaghan; the handle was of pine, and was 13½in. long.

FIG. 97.

FIG. 98.

Stone Axes.—Ireland.

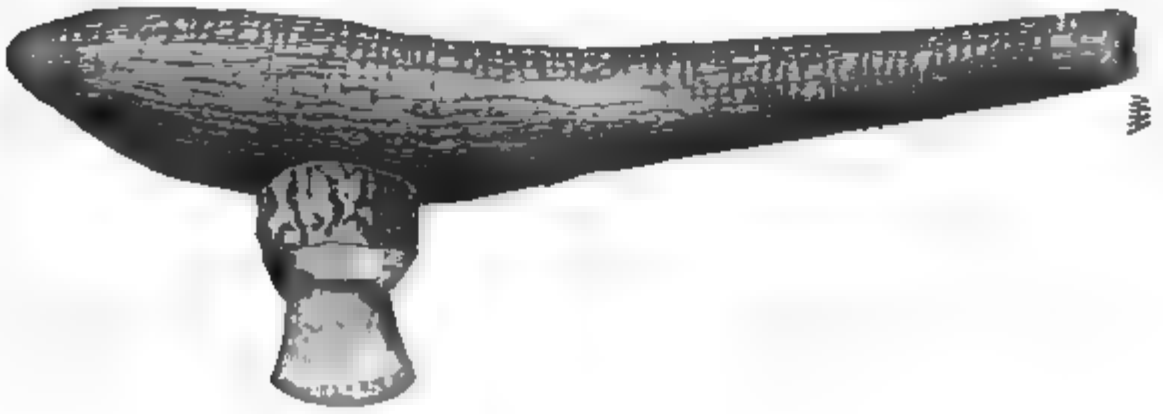
FIG. 99.

Stone Celt in handle.

Fig. 100 represents another stone axe in its handle; this specimen was found at Concise, on the Lake of Neufchatel, and closely resembles the modern African axe (fig. 20). In the latter case, however, the blade is of iron. It will be observed that the Swiss specimen differs from the other two in having an intermediate piece of horn. These horn sockets are very numerous in some of the Swiss lake villages, as for instance at Concise, while in others, as at Wangen, though axes are abundant, none have yet been discovered.

To us, accustomed as we are to the use of metals, it seems difficult to believe that such things were ever made use of; we know, however, that many savages of the present day have no better tools. Yet, with axes such as these, and generally with the assistance of fire, they will cut down large trees, and hollow them out into canoes. The piles used in the Swiss Stone Age lake habitations were evidently, from the marks of the cuts on them, prepared with the help of stone axes; and in the Danish peat bogs, several trees have been found with the marks of stone axes, and of fire, upon them, and in one or two cases stone celts have even been found lying at the side. In the excavations known as Grimes' Graves again, as already mentioned (ante, p. 82), a basalt hatchet was found, which had evidently been used for excavating the gallery, as the marks were still distinctly visible on the walls.

FIG. 100.



Swiss Stone Axe.

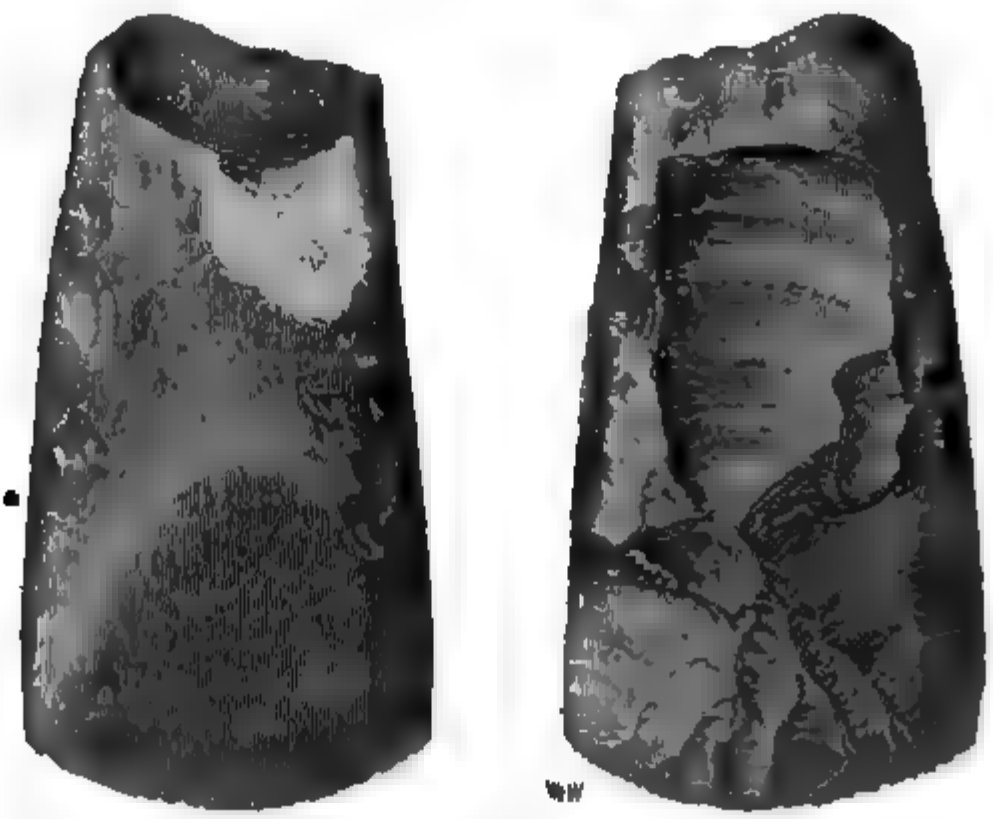
One use of the North American tomahawk was to crush bones for the sake of the marrow *, and it is most probable that the ancient stone axes also served the same purpose.

In many cases the axes themselves bear ample marks of long continued use. For instance, the specimen represented in figs. 101, 102 has no doubt once been much longer, and with surfaces consisting of one continuous sweep, as in pl. 1, fig. 1. The edge, however, having been destroyed by use, it was again chipped sharp and repolished, the new surface

* James' Expedition to the Rocky Mountains, vol. i. p. 193.

meeting the old one at *a*. A second time the edge has become destroyed, and the owner, as may be seen in fig. 102, has commenced the formation of a new one.

Fig. 101. Fig. 102.



Danish Axe.

That they were also weapons of war is probable, not only on *à priori* grounds, but also because they have frequently been found in the graves of chiefs, associated with bronze daggers. About the year 1809, a large cairn in Kircudbrightshire, popularly supposed to be the tomb of a King Aldus M'Galdus, was removed by a farmer. "When the cairn had been removed, the workmen came to a stone coffin of very rude workmanship, and on removing the lid, they found the skeleton of a man of uncommon size. The bones were in such a state of decomposition, that the ribs and vertebræ crumbled into dust on attempting to lift them. The remaining bones, being more compact, were taken out, when it was discovered that one of the arms had been almost separated from the shoulder by the stroke of a stone axe,

and that a fragment of the axe still remained in the bone. The axe had been of greenstone, a material which does not occur in this part of Scotland. There were also found with this skeleton a ball of flint, about three inches in diameter, which was perfectly round and highly polished, and the head of an arrow, also flint, but not a particle of any metallic substance *."

We know also the North American stone axe or tomahawk served not merely as an implement, but also as a weapon, being used both in the hand and also as a missile†.

Another class of stone hatchets are those which are pierced for the handle, as in pl. 1, fig. 2. From the nature of flint, these were scarcely ever made of that material. There are, however, in Copenhagen, two such hatchets, in which advantage has been ingeniously taken of a natural hole in the flint. In many kinds of hard stone, however, it is quite possible to drill a hole by means of a cylinder of bone or horn, with a little sand and water; yet it is very doubtful whether this class of implements truly belong to the Stone Age. The pierced axes are generally found in graves of the Bronze period, and it is most probable that this mode of attaching the handle was used very rarely, if at all, until the discovery of metal had rendered the process far more easy than could have been the case previously.

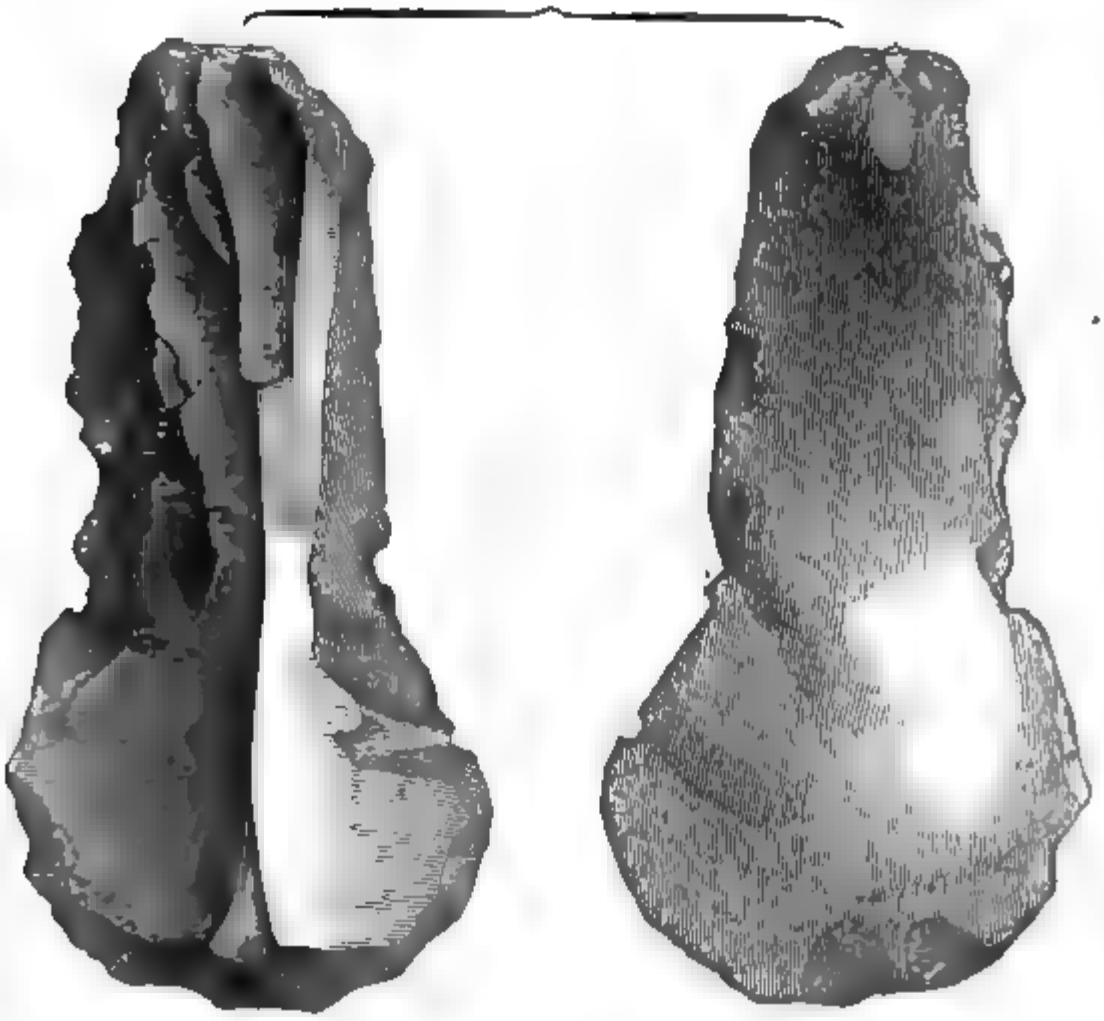
The so-called "scrapers" (figs. 103, 104), are oblong stones, rounded at one end, which is brought to a bevelled edge by a series of small blows. One side is flat, the other, or outer, one is more or less convex; sometimes they have a short handle, which gives them very much the appearance of a spoon. They have been found in England, France, Denmark, Ireland, Switzerland, and other countries. They vary

* New Statist. Acc. Kirkcudbrightshire, vol. iv. p. 332. Quoted by Wilson, Pre-his. Ann. of Scotland, 2nd edit. vol. i. p. 187.

† Colden's History of the Five Nations, vol. i. p. 10.

from one to four inches in length, and from half an inch to two inches in breadth. A modern Esquimaux scraper is represented in figs. 105–107. These modern specimens are in form *identical* with the old ones.

Fig. 103. Fig. 104.



Scraper.

To the small, triangular "axes" (figs. 108–110), which are very characteristic of the Kjökkenmöddings, as well as of the Coastfinds, I have applied the name by which they are usually known, but without wishing to prejudge the question as to their purpose. They are flat on one side, and more or less convex on the other; rudely triangular or quadrangular in shape, with the cutting edge at the broader end; and from 2½in. to 5½in. in length, with a breadth of 1½in. to 2½in. They are never ground, and the cutting edge, though not sharp, is very strong, as it is formed by a plane, meeting the

flat side at a very obtuse angle. Professor Steenstrup doubts whether these curious and peculiar implements were ever intended for axes, and regards them as having been, in all probability, mere weights for fishing lines, in support of which view he figures some not, perhaps, *very* dissimilar stone objects, used for that purpose by the Esquimaux. The so-called edge, in his opinion, neither has nor could have been used for cutting, but is merely the result of that form which was found by the fishermen to be most convenient. He also calls attention to the polished facets on their surfaces,

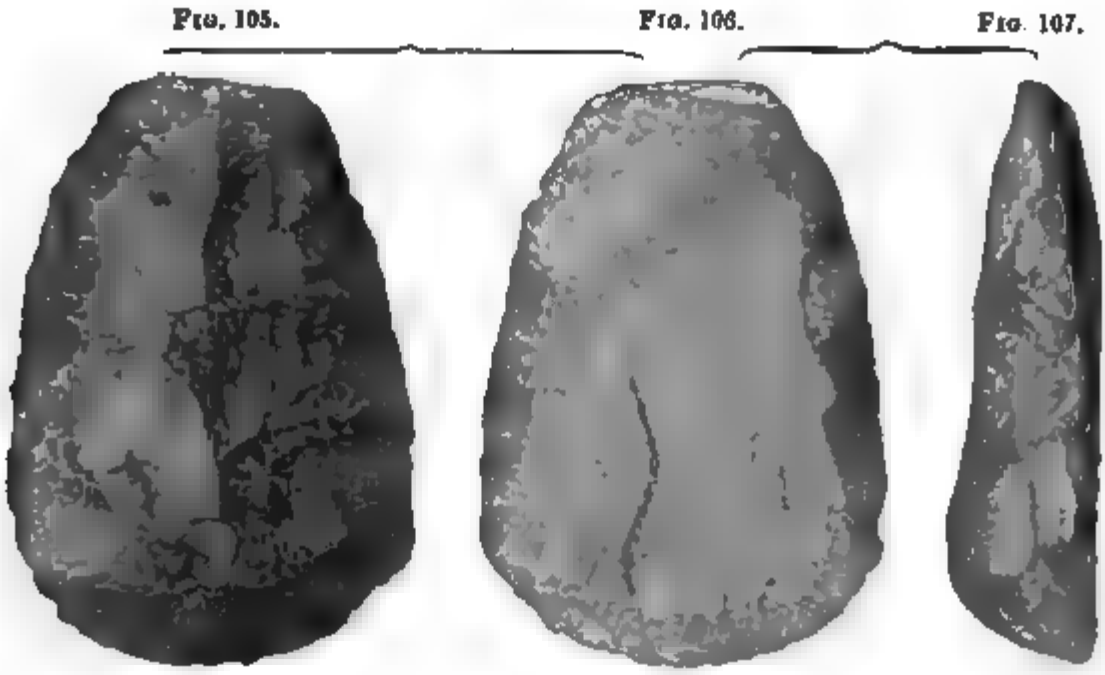


FIG. 105. FIG. 106. FIG. 107.

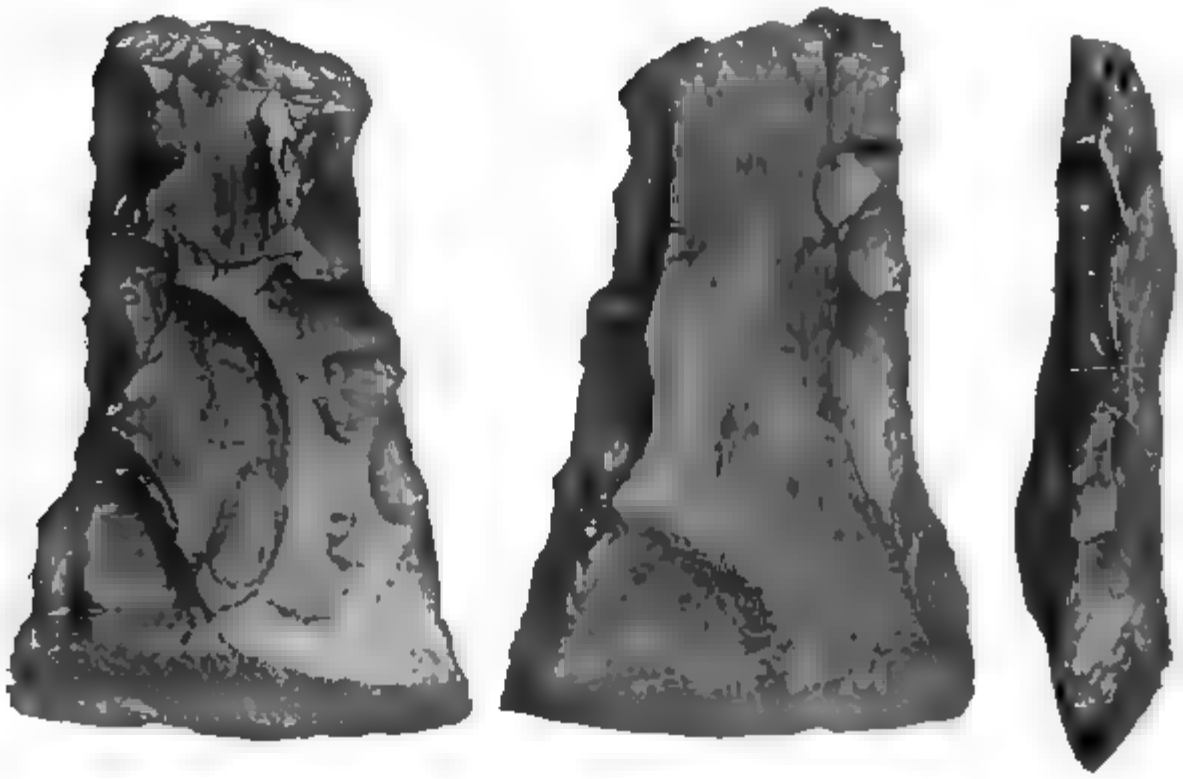
Esquimaux Scraper.

which he regards as affording strong support to his opinion.

It must be at once admitted that there are many of these "axes" which could never have been used for cutting, but these may be regarded as imperfect, and are certainly not to be taken as normal specimens. It is true that the two surfaces, constituting the edge, form a very obtuse angle with one another, but we must remember that if this detracts from the sharpness, it adds greatly to the strength. Moreover, the angle is almost exactly the same as that which we find in the adze of the New Zealanders, and other South Sea Islanders.

Figs. 111–113 represent a recent adze, brought by the Rev. R. Taylor from New Zealand, and now in the British Museum, which very closely resembles the typical axes of the Kjökkenmöddings. The edge, indeed, is polished, but is after all not smoother than the natural fracture of the flint. The projection on the underside of the Danish specimen (fig. 110 *a*.) is accidental, and due to some peculiarity in the flint. This surface is usually as flat in the Danish specimens as in those from New Zealand.

Fig. 108. Fig. 109. Fig. 110.

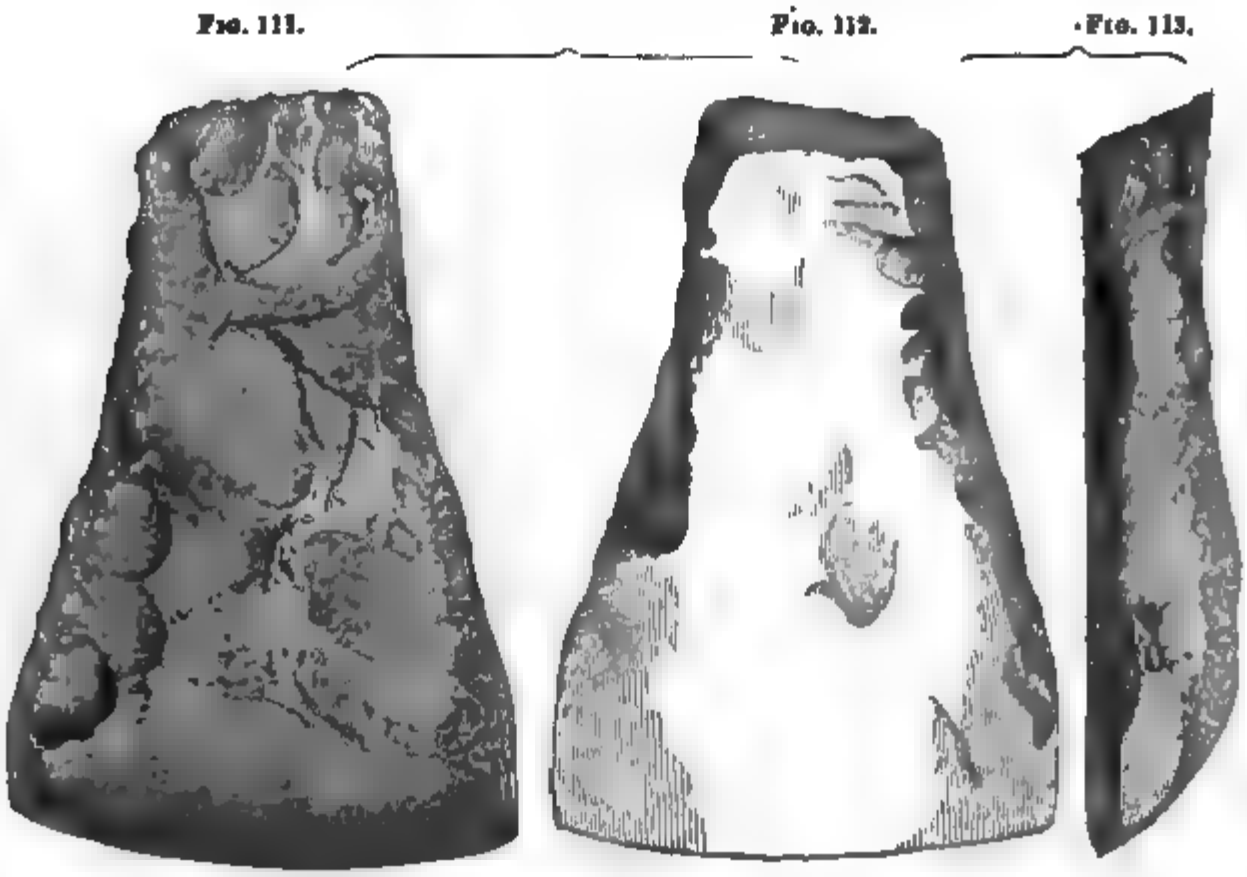


Danish Axe.

The *chisels* (pl. 1, fig. 5) resemble the Danish axes, in having perpendicular sides, but they are narrower, and are almost always ground to a smooth surface. Many of them are slightly hollowed on one side, as in fig. 114.

The flat, semi-circular, flint instruments represented in pl. 1, fig. 3 are common in Denmark, but very rarely, if ever, found in Great Britain, France, or Italy. The convex edge was evidently fastened into a handle of wood, the marks of which

are still, in many cases, plainly visible. The other edge, which is either straight or concave, is generally provided with a number of teeth, giving it more or less resemblance to a saw. In some cases it is so much worn away by use, that the implement takes the form of a new moon or of a boomerang. The edge is in many cases quite polished, evidently by continuous friction against a soft substance. I say a soft substance, because the polished part overlaps on both sides, and



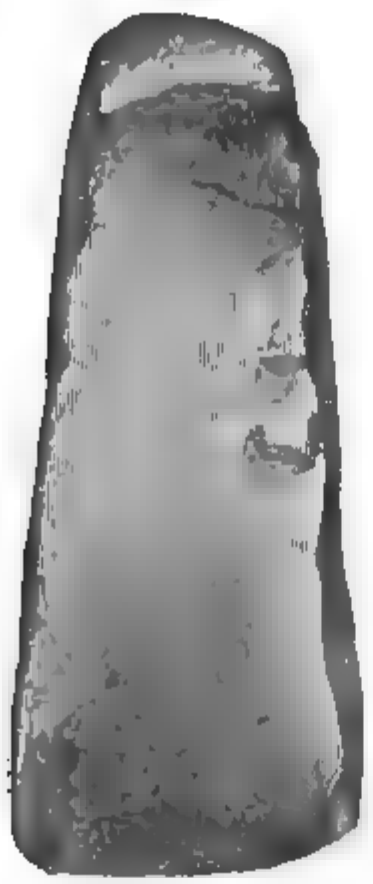
New Zealand Adze

passes in between the teeth of the saw, which would not have been otherwise the case. It is probable that the semi-lunar instruments were fixed in wooden handles, and then used in cleaning skins. Similarly-shaped instruments are even now used as knives by the Esquimaux women, under the name of Ooloos. It might be convenient to apply this term to the ancient Danish specimens.

The so-called "awls" are rude pieces of flint, or flakes worked up at one place by a number of small chips to a

point (fig. 172). Though not very sharp, they are pretty strong.

Fig. 114.



Hollow Chisel.

The *spear-heads* (fig. 115) are very variable in size and form; some of them are scarcely distinguishable from large arrow-heads; others are much larger. Some are so rude that it is questionable whether they were finished, while others are marvellous specimens of ancient art. One in my possession is 12in. in length, 1½ in. in breadth, and of wonderfully beautiful workmanship. It is one of six, found together inside a large tumulus in the island of Moen.

The *daggers* (pl. 1, fig. 4, and fig. 116) are often marvels of skill in flint-chipping. Their form so closely resembles that of metallic daggers, that some antiquaries are inclined to regard them as copies of bronze daggers, and therefore as not belonging to the Stone Age. The localities in which they have been found do not, however, offer any support to this hypothesis. Another form of flint weapon (fig. 117), which is common in Denmark, has a handle like that of the last form, but instead of a blade, it ends in a point, and suggests the idea, that if the tip of the dagger had been accidentally broken off, or the blade rendered narrow by wear and tear, the rest of the weapon might have been worked up into a poniard, and thus utilized. In both these classes the crimping along the edges of the handle is very curious.

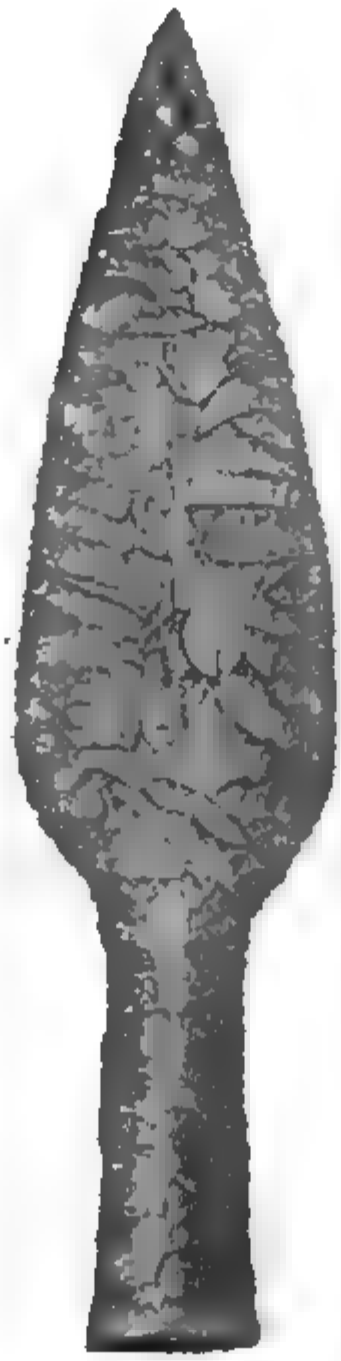
The *slingstones* are of two kinds. The first are merely rough pieces of flint (pl. 1, fig. 12), reduced by a few blows of a hammer to a convenient size and form. But for the

situations in which they are found, these might almost be regarded as natural fragments. Professor Steenstrup is now disposed to think that many of them were used as sink-

Fig. 115.

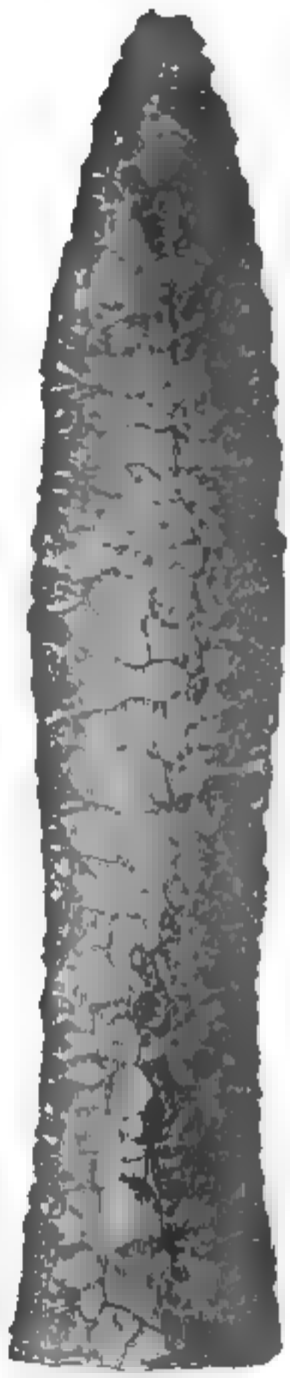
Dagger.

Fig. 116.



Dagger.

Fig. 117.



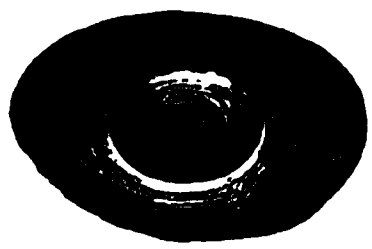
Dagger (broken at the point).

stones for nets, but that some have really served as sling-stones seems to be indicated by their presence in the Peat-mosses, which it is difficult to account for in any other way.

The other kind of slingstones are round, flattish flint disks, some of which are beautifully made.

The *oval tool-stones* (fig. 118), or "Tilhuggersteens "of the northern antiquaries, are oval or egg-shaped stones, more or less indented on one or both surfaces. Their use is not at present thoroughly understood. Some antiquaries suppose that they were held between the finger and thumb, and used as hammers or chippers. If, however, a large series is obtained, it will be found that the depression varies greatly in depth, and that sometimes the stone is completely perforated, which favours the view of those who regard these implements as ringstones for nets, or small hammer heads. It is very doubtful whether these implements really belong to the Stone Age.

FIG. 118.



Oval Tool-stone.

Other stones, in which the longer axis is encircled by a groove, appear to have been evidently intended as sinkstones for nets.

The *arrow-heads* are divided by Sir W. R. Wilde into five varieties. Firstly, the *triangular* (fig. 119), which frequently had a notch on each side to receive the string which attached it to the shaft; secondly, that which is hollowed out or *indented* at the base, as in fig. 120; thirdly, the *stemmed* arrow, which has a tang or projection for sinking into the shaft; fourthly, when the wings are prolonged on each side, this passes into the *barbed* arrow (fig. 121); finally, we have the *leaf-shaped* form, a beautiful example of which is represented in fig. 122. The true arrow-heads are generally about an inch in length, but they pass gradually into the javelin, and from that into the spear-head. The great similarity of arrow-heads, even from the most distant localities, may be seen in figs. 123, 124, and 125, which represent specimens from France, North America, and Tierra del Fuego, respectively.

The different forms were perhaps in use in different tribes, but more probably they are due to the variety of purposes for which they were intended; thus in North America the war arrows taper to the end, so that when the shaft is drawn out, the head

Fig. 119.

Fig. 120.

Fig. 121.

Fig. 122.

Arrow-heads.—Ireland.

Fig. 123.

France.

Fig. 124.

North America.

Fig. 125.

Tierra del Fuego.

remains in the wound; while hunting arrows are expanded at the end, so that the head is drawn out with the shaft.

Among other tribes, the lance-shaped arrows are used in hunting, barbed arrow-heads in war*.

Fig. 126.

Stone Saw.

There are various other kinds of flint implements, such as hammers, saws (fig. 126), harpoons, etc., but—omitting for the present the earlier, or drift types—the above are the principal forms of stone weapons and implements.

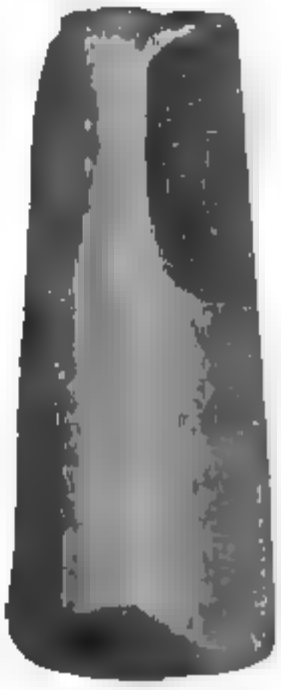
Besides being employed for handling the stone axes, the bones and horns of animals were much used as the material

Fig. 127.

Bone Awl.—Scotland.

of various simple implements, and those of the stag appear to have been preferred, as being the hardest. The commonest bone implement is the pin or awl (fig. 127): not much less numerous are certain oblong chisel-like implements (fig. 128), the use of which it is not easy to determine. Ribs split open, and pointed at one end, are sometimes found, and have been supposed by some archæologists to have served in preparing flax; by others to have been used in the manufacture of pottery. Arrow-heads, spear-heads, chisels, and bone harpoons (figs. 129, 130) also occur. Fig. 130 represents a bone harpoon belonging to the Reindeer period, which will be described in the chapter on Caves. Fig. 131 represents a North American bone chisel used in dressing deer-

Fig. 128.

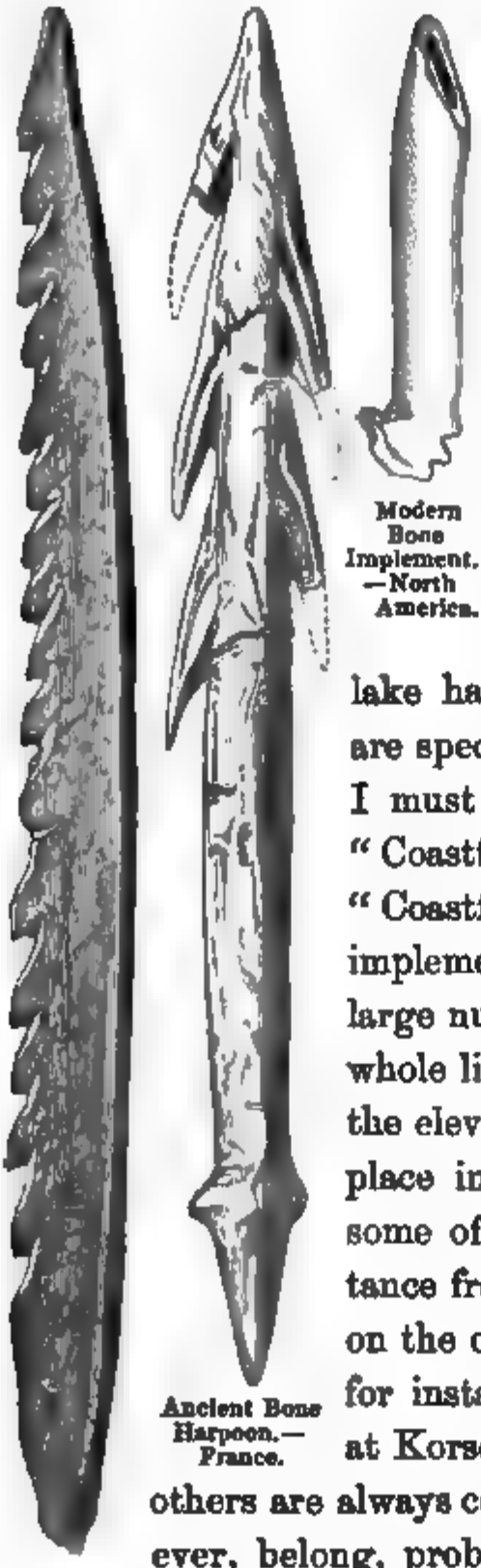


Bone Implement.

* Murray. Travels in N. America, vol. i. p. 385.

skins for taking off the hair. Pierced teeth also were not unfrequently worn as amulets.

Fig. 129. Fig. 130. Fig. 131.



Ancient Bone Harpoon.—Denmark.

Ancient Bone Harpoon.—France.

Modern Bone Implement.—North America.

Stone implements are frequently found on the surface of the ground, or are dug up in agricultural or other operations. But those found singly in this manner have comparatively little scientific value: it is only when they occur in considerable numbers, and especially when associated with other remains, that they serve to throw much light on the manners and customs of ancient times. As already mentioned, the tumuli, the lake habitations, and the shell-mounds are specially valuable in this respect, but I must also say a few words about the "Coastfinds" of the Danish antiquaries. "Coastfinds" are discoveries of rude flint implements, which are found lying in large numbers on certain spots along the whole line of coast. Owing probably to the elevation of the land which has taken place in Jutland since the Stone Age, some of them are now a considerable distance from the present water-line. Some, on the other hand, are at low levels; one, for instance, close to the Railway station at Korsör, is exposed only at low tide, and others are always covered. The "Coastfinds," however, belong, probably, to different classes. Thus, one at Anholt was evidently a workshop of flint implements, as is shown by the character of the chips,

and by the discovery of more than sixty flint cores. Those, on the contrary, which even at the present day are under water, were probably so in old times, and as there are no traces of lake habitations in Denmark, it seems the most natural supposition that they were the places where the fishermen used to drag their nets. It is still usual to choose particular spots for this purpose, and it is evident that many of the rude objects used in fishing, especially of the stones employed as net-weights, would there be lost. The objects discovered are just what might have been expected under these circumstances. They consist of irregular flint chippings, net-weights or sling-stones, flakes, scrapers, awls, and axes.

These six different classes of objects have been found in most, if not all, of the coastfinds, though in different proportions. To give an idea of the numbers in which they occur, I may mention that Professor Steenstrup and I gathered in about an hour at Froëlund near Korsör, 141 flakes, 84 weights, 5 axes, 1 scraper, and about 150 flint chips; while at a similar spot, near Aarhuus in Jutland, I myself picked up, in two hours and a half, 76 weights, 40 flakes, 39 scrapers, 17 awls, and a considerable number of flint chips.

In the sheltered and shallow fjords of Denmark the sea is generally calm, and, in many instances, a layer of sand has accumulated over and thus protected the flint fragments. This was the case with both the above mentioned coastfinds, one of which was exposed in draining the land, the other in a railway cutting. Sometimes a change of currents will remove the light sand, and leave the heavier stones, which again in other cases have lain apparently undisturbed and exposed from the first; and in such instances, the spots are sometimes so thickly strewn with white flints that they may be distinguished by their colour, even at a considerable distance.

Of course, in a sea like that which surrounds our coast, such remains would soon be reduced to mere gravel; besides which, we must remember that on our Southern and Eastern shores, even in historical times, the sea has encroached greatly. "Flintfinds," however, resembling in many respects these Danish "coastfinds," are not altogether unknown in this country. A great number of flint flakes, with a few arrows and cores, were found some years ago by Mr. Shelley in a field near Reigate, but, so far as I am aware, no other forms have yet been observed at this place.

In the Aberdeen Journal (October, 1863), Mr. T. F. Jamieson mentions a spot on the banks of the Ythan, below Ellon, where, in a few minutes, he filled his "pockets with flint flakes, abortive arrow-heads, flint blocks, from which the flakes have been struck off, and other such nondescript articles of ancient cutlery." There are many other places, as, for instance, Bridlington, Pontlevoy, Spiennes, near Mons, several localities near Macon, which have been explored by MM. H. de Ferry and A. Arcelin, and above all the great workshops at Pressigny-le-Grand, discovered by Dr. Leveillé*, where immense numbers of rude hatchets, cores, flakes, spear-heads, etc., have been found. Now that our attention has been called to these flintfinds, no doubt many similar discoveries will be made elsewhere.

Nor are these discoveries confined to Europe. Mr. Busk and Mr. Langham Dale have met with a very similar assemblage of flakes, etc., on the Cape Flats, at the Cape of Good Hope†. Throughout the whole of America, Australia, and Polynesia indeed, stone implements were in use down to a comparatively modern period, and in many parts are so still. In Asia and Africa, on the contrary, as in Europe, stone implements have, for the most part, been long abandoned.

* See Evans' "Archæologia", vol. 40. Stoenstrup and Lubbock, Transactions Ethn. Soc. N. S. vol. v.

† Trans. Ethn. Soc, 1869, p. 51.

Still there, as, for instance, in Algeria and at the Cape, in Palestine and Assyria, in India and Japan, stone implements have been discovered, showing that these countries also, like Europe, have, in all probability, passed through an age of Stone.

CHAPTER V.

MEGALITHIC MONUMENTS AND TUMULI.

ALL over Europe, we might indeed say all over the world, wherever they have not been destroyed by the plough or the hammer, we find relics of pre-historic times—camps, fortifications, dykes, tumuli, menhirs or standing stones,

FIG. 132.

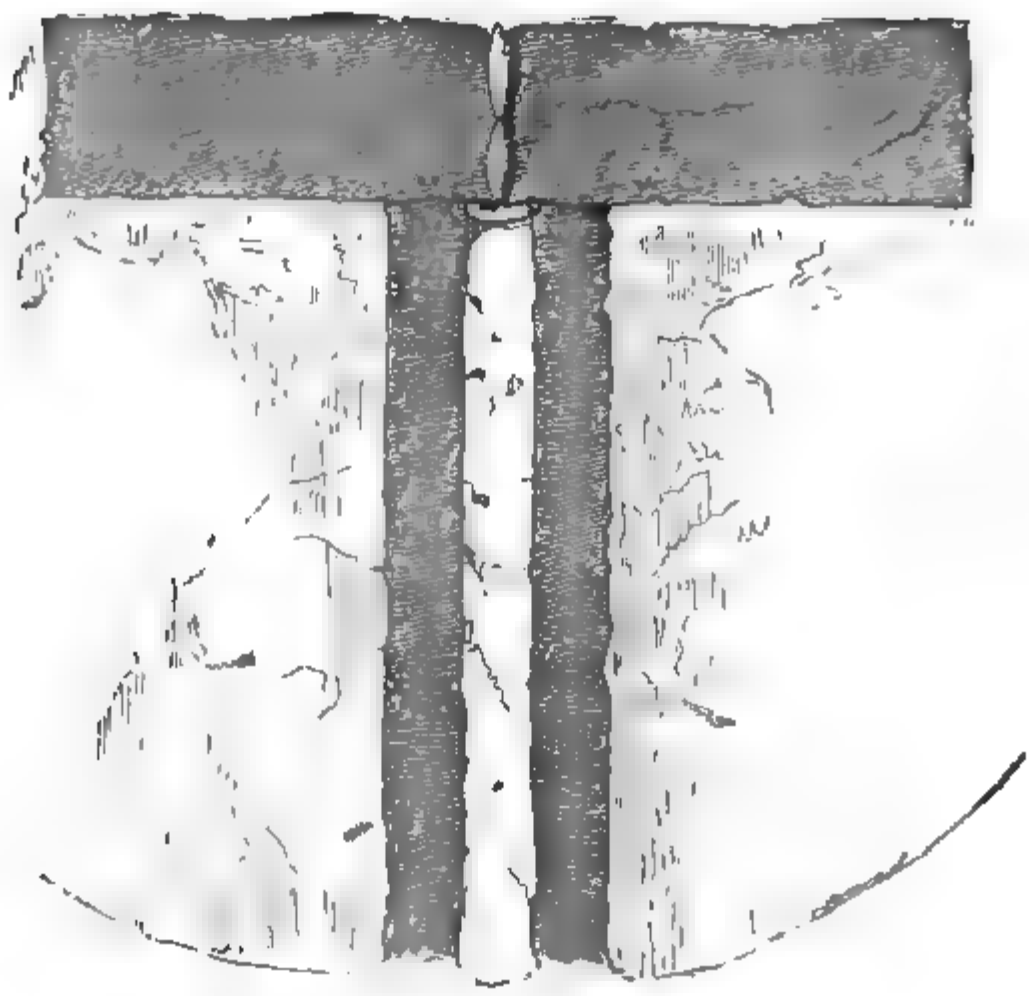
Danish Tumulus.

cromlechs or stone circles, dolmens* or stone chambers, etc., many of which astonish us by their magnitude, while all of

* In this country it has become the custom to reverse these two names. Cromlech, however, is derived from "Crom," a circle, and "Lech," stone, and Dolmen from "Daul," a table, and "Maen," a stone. They should therefore, I consider, be used as in the text. I may add that "Menhir," a standing stone, is derived from "Maen," stone, and "hir," long.

them excite our interest by the antiquity of their origin, and the mystery with which they are surrounded.

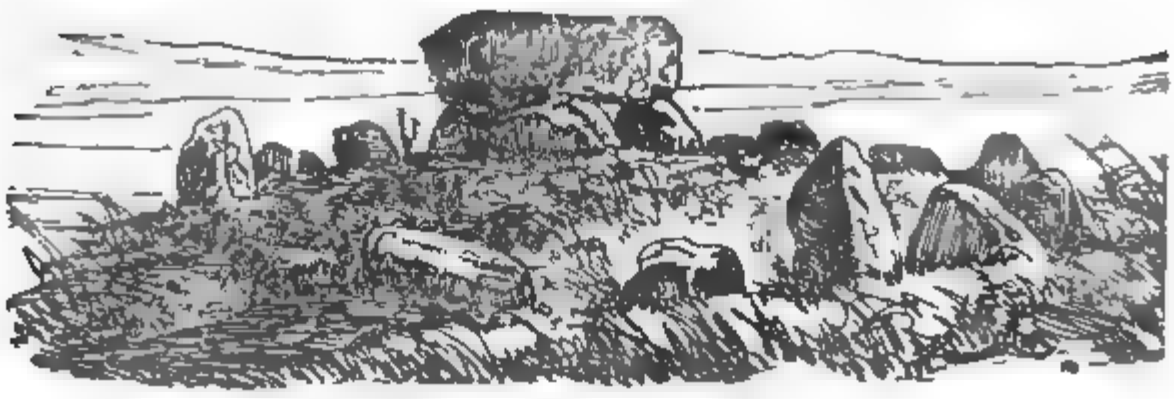
Fig. 133.



Plan of the preceding.

In our own island the smaller tumuli may be seen on almost every down; in the Orkneys alone it is estimated that

Fig. 134.

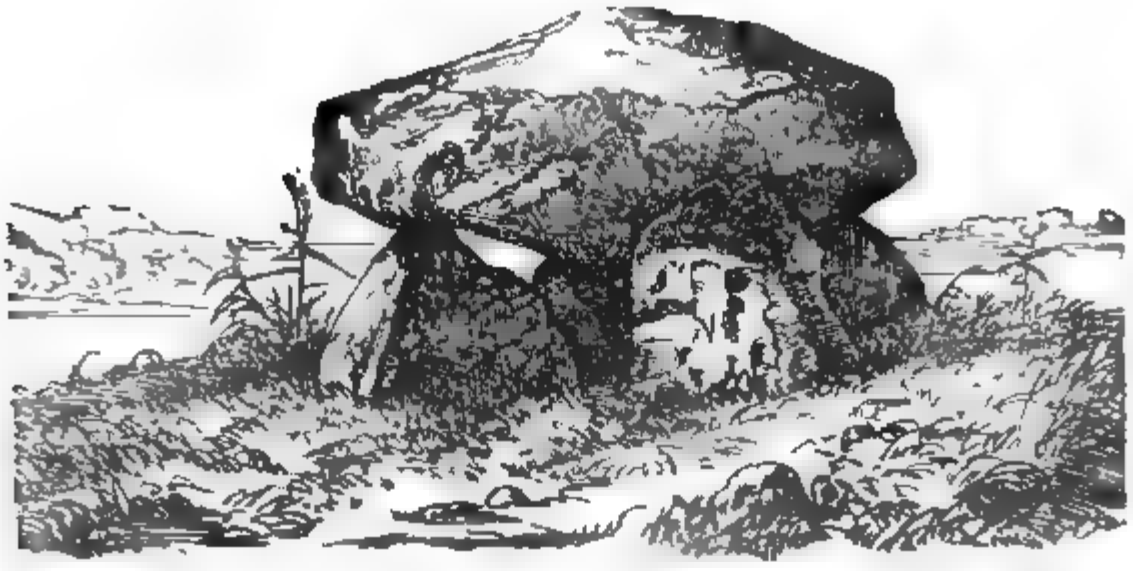


Sepulchral Stone Circle.

more than two thousand still remain; and in Denmark they are even more abundant; they are found all over Europe,

from the shores of the Atlantic to the Oural mountains; in Asia they are scattered over the great steppes, from the

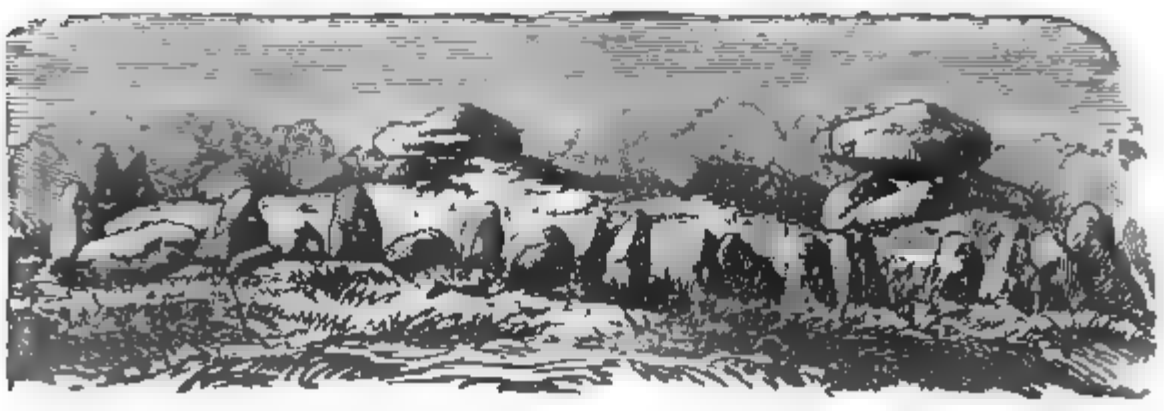
FIG. 135.



Danish Dolmen.

borders of Russia to the Pacific Ocean, and from the plains of Siberia to those of Hindostan; the entire plain of Jelalabad, says Masson, "is literally covered with tumuli and mounds*."

FIG. 136.



Sepulchral Stone Circle.

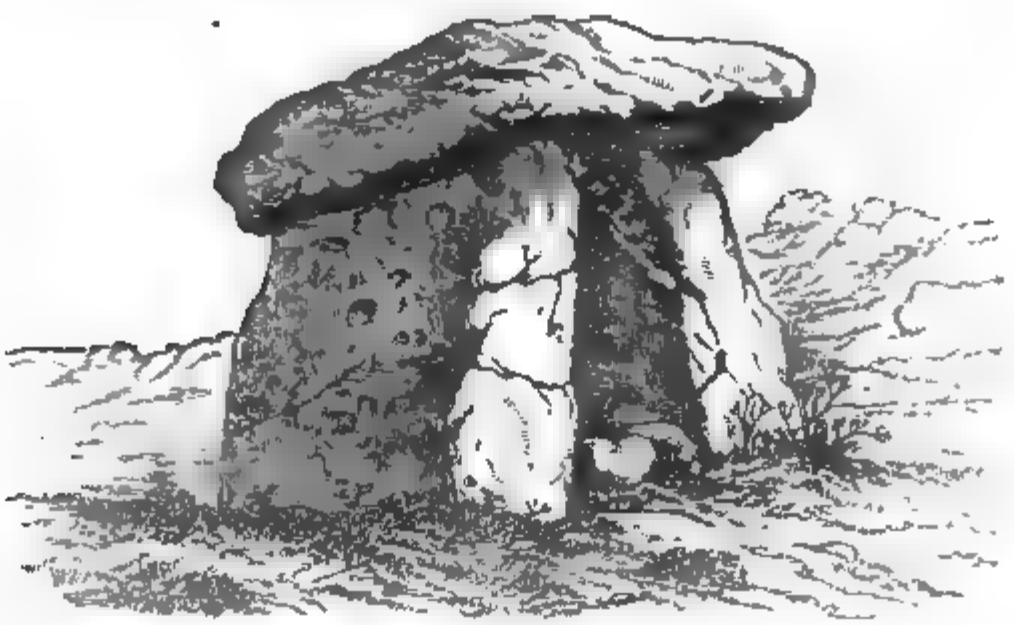
In America we are told that they are to be numbered by thousands and tens of thousands; nor are they wanting in Africa†, where the Pyramids themselves exhibit the most magnificent development of the same idea; indeed the

* Journeys in Baloochistan, Afghanistan, etc., vol. ii. p. 164. See also p. 155, and vol. ii. p. 111–113.

† See, for instance, Livingstone's Miss. Travels, pp. 219. 304.

whole world is studded with the burial places of the dead. Many of them, indeed, are small, but some are very large; Silbury Hill, the highest in Great Britain, has a height of one hundred and seventy feet; but though evidently artificial, there is some doubt whether it is sepulchral.

FIG. 137.



Kit's Coty House.

The standing stones, or "Menhirs," also were no doubt generally erected in memorial of some particular event, the majority being in fact the tombstones of Archaic times.

In addition to these memorials of the past, ancient camps and fortifications crown many of our hills.

In some parts of Scotland the old Hill fortresses present the remarkable peculiarity, first noticed by Mr. John Williams in 1777, of having been subjected to considerable heat. Until 1837 these vitrified forts were supposed to be peculiar to our island, but in that year Professor Zippe called attention to the existence of similar remains in Bohemia, and since that time vitrified forts have been discovered in various parts of France and Germany *.

* References to the various memoirs in which these are described are given by Virchow, Zeit. f. Ethnologie, 1870, p. 258. See also papers by Mr. Stuart and Dr. Fodisch in the Proc. Soc. Antiq. Scotland, vol. viii.

Lastly, the country is intersected by great dykes, or lines of embankment,—such, for instance, as the Wansdyke, the Devil's Dyke at Newmarket, and Offa's Dyke, which runs from the Bristol Channel to the Dee, thus roughly dividing England from Wales,—which were no doubt partly boundary lines and partly fortifications, like the Roman Wall or the still more remarkable Wall of China.

Stone circles, or cromlechs, consist of rough upright stones, arranged in a circle. The usual diameter is about 100 feet, but some are much larger, the principal circle at Abury, for instance, being 1200 feet across. The stones are placed at equal distances, and the number of them had probably some significance. "The two inner circles at Abury, the lesser circle at Stennis, and one at Stanton Drew, each consisted of twelve; the outer circles at Abury, the outer circles of uprights and transoms at Stonehenge, the large circle at Stanton Drew, and the circle at Arbor Low, each of thirty; those of Rollrich and Stennis of sixty; and the large enclosing circle of Abury of one hundred stones. Four circles at Boscawen, and adjacent places in Cornwall, have each been formed of nineteen stones *." Stonehenge is the most celebrated example of a stone circle, but it differs from the usual type in several respects: in having, for instance, the principal stones roughly hewn, and in the presence of capstones.

Stone circles are by no means confined to Europe. Stanley saw, a few miles to the north of Tyre, a circle of rough upright stones; and Kohen, a Jesuit missionary, has recently discovered in Arabia, near Khabb, in the district of Kasim, three large stone circles described as being extremely like Stonehenge, and consisting of very lofty trilithons †.

Arctic travellers, again, mention stone circles and stone

* Thurnam. Crania Britannica. Decade iv.

† Bonstetten. Sur les Dolmens, p. 27.

rows among the Esquimaux. These are, however, of a different character, being quite small, and merely the lower part of the habitations.

Lafitau figures an Indian (Virginian) temple consisting of a circle of upright stones, which, however, are carved at the top into rude representations of human faces*. Mr. Squier mentions stone circles as occurring in Peru†.

Even in Australia stone circles are said to occur. Mr. Ormond, in a letter to Sir J. Y. Simpson‡, says that he has seen many, especially near the Mount Elephant Plains in Victoria. They are "from 10 to 100 feet in diameter, and sometimes there is an inner circle. The stones composing these circles, or circular areas, vary in size and shape. Human bones have been dug out of mounds near these circles. The aborigines have no traditions respecting them. When asked about them, they invariably deny knowledge of their origin."

As regards the period at, or the purpose for, which the European stone circles were erected, history gives us no information.

Mr. George Petrie, indeed, has called Dr. Wilson's attention to several cases in which the Orkney circles were mentioned in old deeds, etc.§ Thus, in 1349, William de Saint Michael was summoned to attend a court held "apud stantes lapides de Rane en le Garniach," to answer for his forcible detention of certain ecclesiastical property; and in 1380, Alexander, Lord of Regality of Badenoch, and son of Robert II., held a court, "apud le standand stanys de la Rathe de Kyngucy Estir," to enquire into the titles by which the Bishop of Moray held certain of His lands. Even so late as the year

* Mœurs des Sauv. Amer. vol. ii. p. 135. I have given a copy in the Origin of Civilization, 2nd ed. p. 179.

† Amer. Nat. vol. iv. p. 12.

‡ Simpson on Ancient Sculpturings. Proc. Soc. Ant. Scot. vol. vi. 1867, p. 81.

§ Pre-historic Annals of Scotland, 2nd edit. vol. i. p. 164.

1438, we find a notice, that "John off Erwyne and Will. Bernardson swor on the Hirdmane Stein before oure Lorde ye Erle off Orknay and the gentiless off the cuntre." This comparatively recent use of the stone circles does not, however, enable us to form any opinion as to the purpose for which they were originally intended.

It is perhaps more to the purpose to observe that both in the Iliad (B. xviii.) and Odyssey (B. viii.) assemblies of elders are mentioned as sitting in solemn conclave on stone seats arranged in circles, but in the former case the seats are said to have been polished. Many, however, of the British stone circles were certainly sepulchral; and it seems probable that this was their original purpose; but that, like other shrines, they were subsequently used as temples.

As regards stone pillars and tumuli, we are told, in Gen. xxxi., that "Jacob took a stone and set it up for a pillar;" and in verse 51, "Laban said to Jacob, Behold this heap, and behold this pillar, which I have cast between me and thee. This heap is a witness, and this pillar is a witness, that I will not pass over this heap to thee, and that thou shalt not pass over this pillar to me, to do me harm," etc. At Mount Sinai Moses erected twelve pillars *. And so, again, when the children of Israel had crossed over Jordan, Joshua took twelve stones and pitched them in Gilgal. "And he spake unto the children of Israel, saying, When your children shall ask their fathers in time to come, saying, What means these stones? Then ye shall let your children know, saying, Israel came over this Jordan on dry land †."

Achan and his whole family were stoned with stones and burned with fire, after which we are told that Israel "raised over him a great heap of stones unto this day. So the Lord turned from the fierceness of his anger." Again, the king

* Ex. xxiv. 4. † Joshua iv. 21, 22.

of Ai was buried under a great heap of stones; and so also was Absalom, of whom likewise we are told that he "reared up for himself a pillar, which is in the King's Dale; for he said, I have no son to keep my name in remembrance, and he called the pillar after his own name, and it is called unto this day Absalom's Place."

According to Diodorus, Semiramis, the widow of Ninus, buried her husband within the precincts of the palace, and raised over him a great mound of earth. Pausanias mentions that stones were collected together, and heaped up over the tomb of Laius, the father of Œdipus. In the time of the Trojan war, Tydeus and Lycus are mentioned as having been buried under two earthen barrows. "Hector's barrow was of stone and earth. Achilles erected a tumulus, upwards of an hundred feet in diameter, over the remains of his friend Patroclus. The mound supposed by Xenophon to contain the remains of Alyattes, Father of Crœsus, king of Lydia, was of stone and earth, and more than a quarter of a league in circumference. In later times, Alexander the Great caused a tumulus to be heaped over his friend Hephæstion, at the cost of 1200 talents, no mean sum, even for a conqueror like Alexander, it being £232,500 sterling*." Virgil tells us that Dercennus, king of Latium, was buried under an earthen mound; and, according to the earliest historians, whose statements are confirmed by the researches of archæologists, mound-burial was practised in ancient times by the Scythians, Greeks, Etruscans, Germans, and many other nations.

By far the greater number of the tumuli in Western Europe are entirely pre-historic, but there are some few, of which the date and origin are known to us, such as the tumuli of Queen Thyra and King Gorm, who died about 950, at Jellinge, in Denmark.

There are, moreover, other cases in which tumuli are men-

* Ten Years' Diggings in the Celtic and Saxon Gravehills, p. v.

tioned, though not in a manner which enables us to identify them with any of those now existing. Thus Gregory of Tours * has a quaint story to the effect that Macliav, flying from his brother Chanaon, took refuge with Chonomor, Count of the Bretons. Chanaon sent messengers to demand that Macliav should be given up to him, but Chonomor concealed him in a tomb, "rearing over him a tumulus in the usual manner, but leaving a small opening for the entrance of air" (componens desuper ex more tumulum, parvumque ei spiraculum reservans, unde halitum resumere posset). He then showed this tumulus to the messengers, and assured them that Macliav was buried in it.

The Codex Diplomaticus contains references to more than sixty barrows or lows, bearing the names of particular persons; some of them, as for instance, Wódne's Beorgh, or Woden's Barrow, are probably mythical, but there is no reason whatever to doubt that some, for instance Alfrede's Beorh, Æthelwolde's Beorh, Cissan Beorh, Cwichelme's Hlœw, Oswolde's Hlœw, etc., retain the name of the person really buried within †. It appears that in England the habit of burying under tumuli was finally abandoned during the 10th century.

The Danish Sagas also tell us that in the middle of the 8th century, Sigurd Ring, having conquered his uncle, King Harald Hildetand, in the battle of Braavalla, "washed the corpse, placed it on Harald's war chariot, and buried it in a tumulus which he had formed for the purpose. Harald's horse also was slain and buried with him, with the saddle, so that Harald might either ride to Valhalla, or go in his chariot, as he preferred. Ring then gave a great feast, after which he recommended the chiefs present to throw their ornaments

* Historia Francorum, iv. 4.

† For an interesting memoir on notices of heathen interment in the Codex Diplomaticus, see Kemble, Arch. Jour. vol. xiv. p. 119.

and arms into the tumulus in honour of Harald. Finally the tumulus was carefully closed *."

Most of these monuments, however, are doubtless far older. Some, indeed, were ancient and mysterious even in the days of Homer. Thus at the burial of Patroclus, when Nestor is pointing out to his son Antilochus the course for the chariot race, he says,—

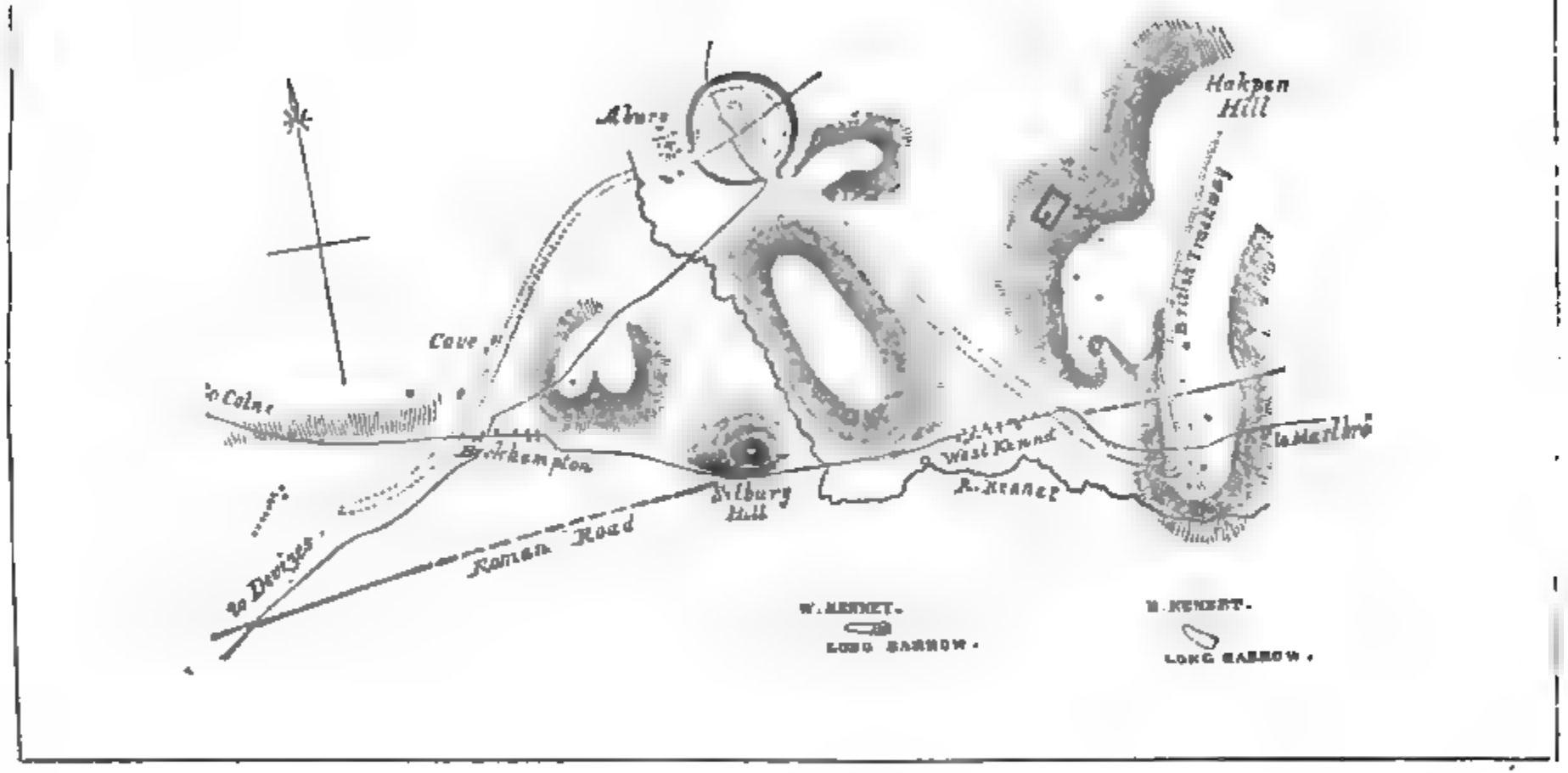
"Plain is the goal
That now I tell thee of; nor canst thou miss it:
* * * * *
On either side
Where narrowest is the way, and all the course
Around is smooth, rise two white stones, set there
To mark the tomb of some one long since dead,
Or form a goal for men in ages past †."

It is very striking to find these Menhirs mentioned in our earliest writings, as monuments of events even then already lost in the obscurity of the past.

Many of the very largest tumuli in Western Europe appear, from the nature of their contents, to have been constructed during the Stone Age. At first, indeed, it seems almost incredible that the immense tumuli of Brittany should have been erected by a people who possessed no metal. We must remember, however, that some of the South Sea monuments were quite as considerable. Moreover, though hundreds of beautiful stone axes and ornaments have been found in the tumuli of Brittany, no weapons of metal have yet occurred in them. It has been supposed that the carvings on some of the stones could not have been cut without metal. Actual

* Engelhardt. Guide Illustré du Musee des Antiquités du Nord à Copenhague. 1868. See also Saxo Grammaticus. His. Dan. l. x. ch. xii.

† Iliad, xxiii. 384. I have quoted from Mr. Wright's translation, which in this passage, at least, is more faithful than that of any other with which I am acquainted.



Ground Plan of Abury. From Dr. Thurnam's paper on a Long Barrow at West Kennet (Archæologia, vol. xxxviii. p. 406).

[*To face page* 119.]

experiments, however, as Messrs. Bertrand and de Mortillet have shown me, prove that the stone can be cut with flint, while bronze produces no effect on it. Sir James Y. Simpson also finds that the engravings on the Scotch rocks, even those on granite, may have been carved with a flint tool *.

In this country we still habitually call the megalithic monuments "Druidical," but it is hardly necessary to mention that there is really no sufficient reason for connecting them with Druidical worship.

Perhaps the greatest of all so-called Druidical monuments is, or rather was, the temple of Abury, in Wiltshire. It is, indeed, much less known than Stonehenge; and yet, though a ruder, it must have been originally even a grander temple. According to Aubrey, Abury "did as much exceed Stonehenge as a cathedral does a parish church." When perfect, it consisted of a circular ditch and embankment, containing an area of 28½ acres; inside the ditch was a circle of great stones, and within this, again, two smaller circles, formed by a double row of smaller stones, standing side by side. From the outer embankment started two long winding avenues of stones, one of which went in the direction of Beckhampton, and the other in that of Kennet, where it ended in another double circle. Stukely supposed that the idea of the whole was that of a snake transmitted through a circle; the Kennet circle representing the head, the Beckhampton avenue the tail. Midway between the two avenues stood Silbury Hill, the largest artificial mound in Great Britain, measuring no less than 170 feet in height. From its position, it appears to form part of the general plan, and though it has been twice examined, no primary interment has been found in it. On the whole, this appears to have been at one time the finest megalithic ruin in Europe; but, unfortunately for us, the pretty little village of Abury, like some beautiful parasite,

* Proc. Soc. Antiq. Scotland, vol. vi. 1867, p. 122.

has grown up at the expense, and in the midst, of the ancient temple, and out of 650 great stones, not above 20 are still standing.

In a very interesting memoir* Mr. Fergusson has attempted to prove that both Stonehenge and Abury belong to post-Roman times. "The Roman road," he says, "from Bath to Marlborough, either passes under Silbury Hill, or makes a sudden bend to get round it in a manner that no Roman road, in Britain at least, was ever known to do. . . . No one standing on Oldborough Down, and casting his eye along its straight unbending line, can avoid seeing that it runs straight at the centre of Silbury Hill. It is true, it may have diverged just before hitting it, but nothing can be more unlikely. It would have been just as easy for the Roman engineer to have carried its arrow-like course a hundred yards to the right. This, indeed, would have been a preferable line, looked at from a Roman point of view,—straight for Marlborough, to which it was tending, and *fitting better to a fragment of the road* found beyond the village of Kennet. But all this was disregarded, if the hill existed at that time, and the road runs straight at its heart, as if on purpose to make a sharp turn to avoid it,—a thing as abhorrent to a Roman road-maker, as a vacuum is said to be to nature. From a careful examination of all the circumstances of the case, the conclusion seems inevitable, that Silbury Hill stands *on* the Roman road, and consequently must have been erected subsequently to the time of the Romans leaving the country."

Startled by this argument, and yet satisfied that there must be some error, I turned to the Ordnance map, and found, to my surprise, that the Roman road was distinctly laid down as passing, not under, but at the side of, Silbury Hill. Not content with this, I persuaded Professor Tyndall

* Quarterly Review, July, 1860, p. 209.

to visit the locality with me, and we convinced ourselves that upon this point the map was quite correct. The impression on our minds was that the Roman engineer, in constructing the road from Morgan's Hill, had taken Silbury Hill as a point to steer for, swerving only just before reaching it. Moreover, the map will show that not only this Roman road, but some others in the same part of England, are less straight than is usually the case.

Since the first edition of this work was published, excavations, at which I was present, have been made at the side of Silbury Hill, and the ditches running along the Roman road were clearly traced. Mr. Fergusson himself admits, in the passage just cited, that the pieces of the road on the two sides of Silbury Hill are not in the same straight line, so that there must have been a bend somewhere. On the whole, therefore, I quite agree with old Stukeley, that the Roman road curved abruptly southward, to avoid Silbury Hill, and that "this shows Silbury Hill was ancienter than the Roman road*." How much more ancient it is impossible to say†.

As regards Stonehenge, we have, I think, satisfactory reasons for attributing it to the Bronze Age.

The *historical* account, if I may use such an expression, of Stonehenge is, that it was erected by Aurelius Ambrosius in memory of the British chieftains, treacherously murdered by Hengist and the Saxons, about the year 460. Giraldus Cambrensis, writing at the close of the 12th century, says, "That there was in Ireland, in ancient times, a pile of stones worthy of admiration, called the Giant's Dance, because giants, from the remotest part of Africa, brought them into

* Mr. Blandford, who superintended the opening of the Hill in 1849, came also to the same conclusion. Proc. Archæol. Inst. 1849, p. 303. See also the interesting memoir in the same volume, by the Rev. A. C. Smith.

† Stukeley thinks it was founded in 1859 B.C., the year of the death of Sarah, Abraham's wife.

Ireland; and in the plains of Kildare, not far from the Castle of Naas, as well by force of art as strength, miraculously set them up; and similar stones, erected in a like manner, are to be seen there at this day. It is wonderful how so many and such large stones could have been collected in one place, and by what artifice they could have been erected; and other stones, not less in size, placed upon such large and lofty stones, which appear, as it were, to be so suspended in the air, as if by the design of the workmen, rather than by the support of the upright stones. These stones (according to the British history) Aurelius Ambrosius king of the Britons, procured Merlin, by supernatural means, to bring from Ireland into Britain. And that he might, leave some famous monument of so great a treason to future ages, in the same order and art as they stood formerly, set them up where the flower of the British nation fell by the cut-throat practice of the Saxons, and where, under the pretence of peace, the ill-secured youth of the kingdom, by murderous designs, were slain*."

This account is clearly mythical. The larger stones were evidently obtained in the neighbourhood, and are in fact "Sarcens," identical with those which occur in hundreds on Salisbury Plain. Moreover, the very name of Stonehenge, like those of Stanton Drew, Stennis, etc., seems to me a very strong argument against those who attribute these monuments to so recent an origin. Stonehenge is generally considered to mean the Hanging-stones, as indeed was long ago suggested by Wace, an Anglo-Norman poet, who says:

Stanhengues ont nom en Englois
Pieres pandues en Francois †,

but it is surely more natural to derive the last syllable from the Anglo-Saxon word "ing," a field; as we have Keston,

* Giraldus. Topogr. of Ireland.
† Wright's Wanderings of an Antiquary, p. 301.

originally Kyst-staning, the field of stone coffins. What more natural than that a new race, finding this magnificent ruin, standing in solitary grandeur on Salisbury Plain, and able to learn nothing of its origin, should call it simply the *place of stones?* What more unnatural than that they should do so, if they knew the name of him in whose honour it was erected? The plan also of Stonehenge seems to be a sufficient reason for not referring it to post-Roman times. It has, indeed, been urged that if Stonehenge had existed in the time of Cæsar, we should find it mentioned by ancient writers. Hecatæus, however, does allude to a magnificent circular temple, in the island of the Hyperboreans, over against Celtica, and many archæologists have confidently assumed that this refers to Stonehenge. But why should we expect to find it described, if it was, as we suppose, even at that time a ruin, more perfect, no doubt, than at this day, but still a ruin? The Caledonian Wall was a most important fortification, constructed by the Romans themselves, and yet, as Dr. Wilson tells us*, only one of the Roman historians makes the least allusion to its erection, nor is Abury itself mentioned by any mediæval author.

It is evident that Stonehenge was at one time a spot of great sanctity. A glance at the Ordnance map will show that tumuli cluster in great numbers round, and within sight of it; within a radius of three miles, there are about three hundred burial mounds, while the rest of the country is comparatively free from them. If, then, we could determine the date of these tumuli, we should be justified, I think, in referring the Great Temple itself to the same period. Now, of these barrows, Sir Richard Colt Hoare examined a great number, 151 of which had not been previously opened. Of these the great majority contained interments by cremation, in the manner usual during the Bronze Age.

* Pre-Historic Ann. of Scot. vol. ii. p. 39.

Only two contained any iron weapons, and these were both secondary interments; that is to say, the owners of the iron weapons were not the original occupiers of the tumuli. Of the other burial mounds no less than 39 contained objects of bronze, and one of them, in which were found a spear-head, and pin of bronze, was still more connected with the temple by the presence of fragments, not only of Sarcen stones, but also of the blue stones which form the inner circle at Stonehenge; and which, according to Sir R. C. Hoare, do not naturally occur in Wiltshire. Stonehenge then may, I think, be regarded as a monument of the Bronze Age, though apparently it was not all erected at one time, the inner circle of small, unwrought, blue stones being, probably, older than the rest; as regards Abury, since the stones are all in their natural condition, while those of Stonehenge are roughly hewn, it seems reasonable to conclude that Abury is the older of the two, and belongs either to the close of the Stone Age, or to the commencement of that of Bronze.

Both Abury and Stonehenge were, I believe, used as temples. Some of the stone circles, however, have been proved to be burial places. In fact, a complete burial place may be described as a dolmen, covered by a tumulus, and surrounded by a stone circle. Often, however, we have only the tumulus, sometimes only the dolmen, and sometimes again only the stone circle.

The celebrated monument of Carnac (fig. 138), in Brittany, consists of eleven rows of unhewn stones, which differ greatly both in size and height, the largest being 22 feet above ground, while some are quite small. It appears that the avenues originally extended for several miles, but at present they are very imperfect, the stones having been cleared away in places for agricultural improvements. At present, therefore, there are several detached portions, which, however, have the same general direction, and appear to

have been connected together. Fig. 138 is from a sketch made by Dr. Hooker, when we visited Brittany together, in the spring of 1867.

Most of the great tumuli in Brittany probably belong to the Stone Age, and I am therefore disposed to regard Carnac as having been erected during the same period.

FIG. 138.

Carnac.

Megalithic erections, resembling those which are generally, but without sufficient reason ascribed to the Druids, are found in very distant countries. In Moab, De Saulcy observed rude stone avenues, and other monuments, which he compares to Celtic dolmens. Lieut. Oliver, also, mentions that the Hovas of Madagascar to this day erect monoliths and stone tombs closely resembling those of Western Europe*. Mr. Maurice† was, I believe, the first to point out, that in some parts of India, there are various monuments of stone, which, in the words of Colonel Yule, "recall strongly those mysterious, solitary, or clustered monuments of unknown origin, so long the puzzle and delight of antiquaries, which abound in our native country, and are seen here and there in all parts of Europe and Western Asia‡." Mr. Fer-

* Trans. Ethn. Soc. 1870, p. 67.

† India Antiqua.

‡ Jour. of the Asiat. Soc. of Bengal, vol. xiii. p. 617. See also Proc.

gusson goes farther, and argues with great ingenuity that the "Buddhist architecture in India, as practised from the third century B.C. to seventh A.D., is essentially tumular, circular, and external, thus possessing the three great characteristics of all the so-called Druidical remains*." These resemblances, indeed, are too great to be accidental, and the differences represent, not so much a difference in style, as in civilization. Thus, the tumuli of India, though sometimes of earth, are "generally of rubble masonry internally, and of hewn stone or brick on the external surface, and originally were apparently always surrounded by a circular enclosure of upright stones, though in later times this came to be attached to the building as an ornamental band, instead of an independent feature. In the most celebrated example in India, that at Sanchee, the circle consists of roughly squared upright stone posts, joined at the top by an architrave of the same thickness as the posts, exactly as at Stonehenge; the only difference being the insertion of three stone rails between each of the uprights, which is a masonic refinement hardly to be expected among the Celts." In India, then, the circles of stones seem generally to have surrounded tumuli; but this is not always the case, and there are some, "which apparently enclose nothing." Again, they are generally covered with sculpture; but to this also there are exceptions, as, for instance, at Amravati, where there are numberless little circles of rude unhewn stone, identical with those in this country, but smaller."

In Europe we know that the stones of Megalithic monuments are almost invariably uncarved.

There is indeed a dolmen, near Confolens in Charente, in

Soc. Antiq. Scotland, vol. i. p. 93. Babington, Trans. Lit. Soc. Bombay, 1823. Congreve, Madras Jour. of Lit. and Science, 1847. Yule, Proc. Soc. Ant. Scotland, vol. i. p. 93. Wise, ditto, p. 154. Hooker's Himalayan Journals. Taylor, Trans. Roy. Irish Acad. vol. xxiv. &c.

* l. c. p. 212.

which the upper stone is supported, not on rude stone blocks, but on four slender columns*. I agree, however, with M. Rochebrune, that the supports were probably carved at a period long subsequent to the erection of the monument†. At Stonehenge the stones are roughly hewn, but at this stage the Megalithic architecture in Western Europe seems to have been replaced by a totally different style. In Algeria‡, on the contrary, it advanced further; we there find tumuli of regular masonry and stone circles, in which the floors are paved. On the principal stones in one of the stone circles are letters, the meaning of which, however, is unknown. In India it reached a still higher stage of development, so that it requires an observant eye to detect in the rude cromlechs, stone circles, and tumuli, the prototypes of the highly decorated architecture of the Buddhists.

It is a very remarkable fact, that even to the present day, some of the hill tribes in India continue to erect menhirs, cromlechs, and other combinations of gigantic stones, sometimes singly, sometimes in rows, sometimes in circles, in either case very closely resembling those found in Western Europe. Among the Khasias§, "the funeral ceremonies are the only ones of any importance, and are often conducted with barbaric pomp and expense; and rude stones of gigantic proportions are erected as monuments, singly or in rows, circles, or supporting one another like those of Stonehenge, which they rival in dimensions and appearance."

The single pillars are sometimes tombstones, sometimes memorials of important events. Colonel Yule once asked a native if there were any tradition about one of these pillars,

* Statistique Monumentale de la Charente.

† Mém. sur les Restes d'industrie appartenant aux temps primordiaux dans le Dép. de la Charente. 1866.

‡ Recueil des Notices et Mémoires de la Société Archéologique de la Province de Constantine. 1863, p. 214. See also Letourneux. Ar. f. Anthropologie. 1868, p. 307.

§ Dr. Hooker's Himalayan Jour. vol. ii. p. 276. See also p. 320.

which is known as Mausmai, i. e. "the stone of the oath." "There was war," said the man, "between two villages, and when they made peace, and swore to it, they *erected this stone for a witness**."

FIG. 139.

Indian Dolmens.

Dr. Hooker† has called attention to the fact that the Khasian word for a stone, "Mau," as commonly occurs in the names of their villages and places, as that of Man, Maen, and Men does in those of Brittany, Wales, Cornwall, etc., thus Mausmai signifies in Khasia the Stone of Oath,—Mamloo, the Stone of Salt,—Mouflong, the grassy Stone, just as in Wales, Penmaenmawr signifies the hill of the big stone; while a Menhir is a standing stone, and a Dolmen a table stone, etc. Those who believe that the use of metal was introduced into Europe by a race of Indo-European origin, will find in these facts an interesting confirmation of their opinion.

How closely these Indian dolmens resemble those of Europe may be seen by comparing figs. 139 and 140, with 531 and 137.

* Proc. Soc. Antiq. Scotland, vol. i. p. 93.

† Address to the British Association, 1868, p. 7.

The Indian dolmens, as shown in the valuable memoirs by Captain Meadows Taylor* (figs. 139, 140), may truly be said to be identical with those of Western Europe. He examined a very considerable number, having obtained particulars of no less than 2129 dolmens in the district of Bellary, in the Dekhan, and it is interesting that, as is sometimes the case in Europe, more than 1100 had an opening in one of the side stones, doubtless in order to introduce food for the dead. Montperieux figures (pl. xxx.) a dolmen with a similar hole in his work on the Caucasus; and Schoolcraft mentions that in the United States the Redskins very frequently left an opening in the grave cover for the same purpose†.

FIG. 140

Indian Dolmen.

We must not, however, attribute too much importance to the similarity existing between the megalithic erections in various parts of the world. Give any child a box of bricks, and it will immediately build dolmens, cromlechs, and "trilithons," like those of Stonehenge, so that the construction of these remarkable monuments may be regarded as another illustration of the curious similarity existing between the child and the savage.

* Trans. R. Irish Academy, vol. xxiv. p. 329. See also Col. Forbes Leslie's valuable work, "The Early Races of Scotland."

† Schoolcraft's Indian Tribes, Pt. i. p. 33.

Tumuli or barrows are much more numerous and more widely distributed than stone circles. No doubt the great majority of them are burial mounds, but some also were erected as memorials, like the "heap of witness" erected by Laban and Jacob, or the mound heaped up by the Ten thousand in their celebrated retreat, when they obtained their first view of the sea.

The size of the tumulus may be taken as a rough indication of the estimation in which the deceased was held, as James* also tells us was the case among the North American Indians. The Scotch Highlanders† have a complimentary proverb, "Curri mi clach er du cuirn," i. e. "I will add a stone to your cairn," and I am informed by Mr. R. Gray that the custom still exists in the Hebrides, as it does among various savage and semi-savage races.

The remark made by Schoolcraft as regards the American Indians is applicable to many savage tribes. "Nothing that the dead possessed was deemed too valuable to be interred with the body. The most costly dress, arms, ornaments, and implements, are deposited in the grave;" which is "placed in the choicest scenic situations—on some crowning hill or gentle eminence in a secluded valley." And the North American Indians are said, even until within the last few years, to have cherished a friendly feeling for the French, because, in the time of their supremacy, they had at least this one great merit, that they never disturbed the resting-places of the dead.

Coffins do not appear to have been used during the Stone Age, though Mr. Greenwell has sometimes found traces of decayed wood, and in one case the side of a grave showed the impression of a rough board. The majority of tumuli are mere heaps of earth, or of stones, covering the bones or ashes of the

* Expedition to the Rocky Mountains, vol. ii. p 2.

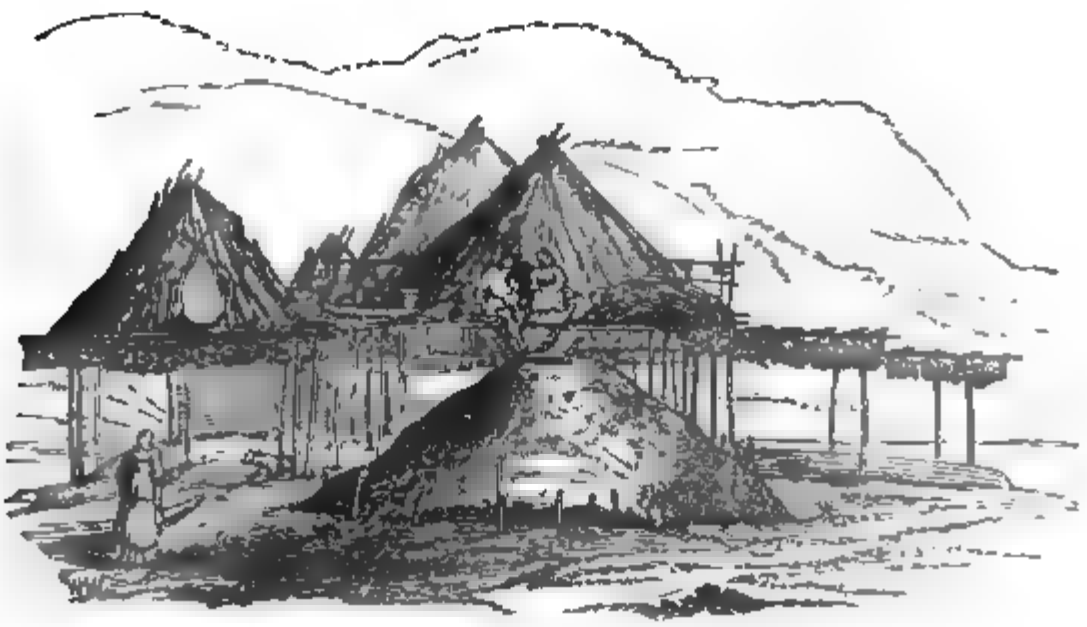
† Wilson, Pre-historic Annals of Scotland, vol. i. p. 86, 2nd ed.

dead; in many cases, however, the mound contains a cist of stones, evidently intended to protect the remains of the deceased, while in other cases the dead was buried in a dolmen, more or less resembling those represented in figs. 135–137, and the whole was then covered over. Such dolmens, either covered or uncovered, occur, as already mentioned, in Northern Africa, and in India. Some archæologists have considered that all dolmens were originally covered with earth or stones, but I think the evidence shows that some at least were intentionally left exposed.

Some of the oldest tumuli of Scandinavia are of a different character. They contain a passage, formed by great blocks of stone, almost always opening (as do those of Brittany) towards the south or east—never to the north—and leading into a large central chamber, round which the dead sit. At Goldhavn, for instance, in the year 1830, a grave (if so it can be called) of this kind was opened, and numerous skeletons were found, sitting on a low seat round the walls, each with his weapons and ornaments by his side. Now, the dwellings used by Arctic nations—the "winter-houses" of the Esquimaux and Greenlanders, the "Yurts" of the Siberians—correspond closely with these "Ganggraben" or "Passage graves." The Siberian Yurt, for instance, as described by Erman, consists of a central chamber, sunk a little in the ground, and, in the absence of great stones, formed of timber, while earth is heaped up on the roof and against the sides, reducing it to the form of a mound. The opening is on the south, and a small hole for a window is sometimes left on the east side. Instead of glass, a plate of ice is used; it is at first a foot thick, and four or five generally last through the winter. The fire-place is opposite the entrance; and round the sides of the room, against the walls, "the floor is raised for a width of about six feet, and on this elevated part the inmates slept at night, and sat at work by day."

Captain Cook gives a very similar description of the winter habitations used by the Tschutski in the extreme north-east of Asia. They are, he says*, "exactly like a vault, the floor of which is sunk a little below the surface of the earth. One of them, which I examined, was of an oval form, about twenty feet long and twelve or more high. The framing was composed of wood, and the ribs of whales, disposed in a judicious manner, and bound together with smaller materials of the same sort. Over this framing is laid a covering of strong coarse grass, and that, again, is covered with earth; so that, on the outside, the house looks like a little hillock supported by a wall of stone three or four feet high, which is built round the two sides and one end."

Fig. 141.



Summer and Winter Dwellings.—Kamskatka.

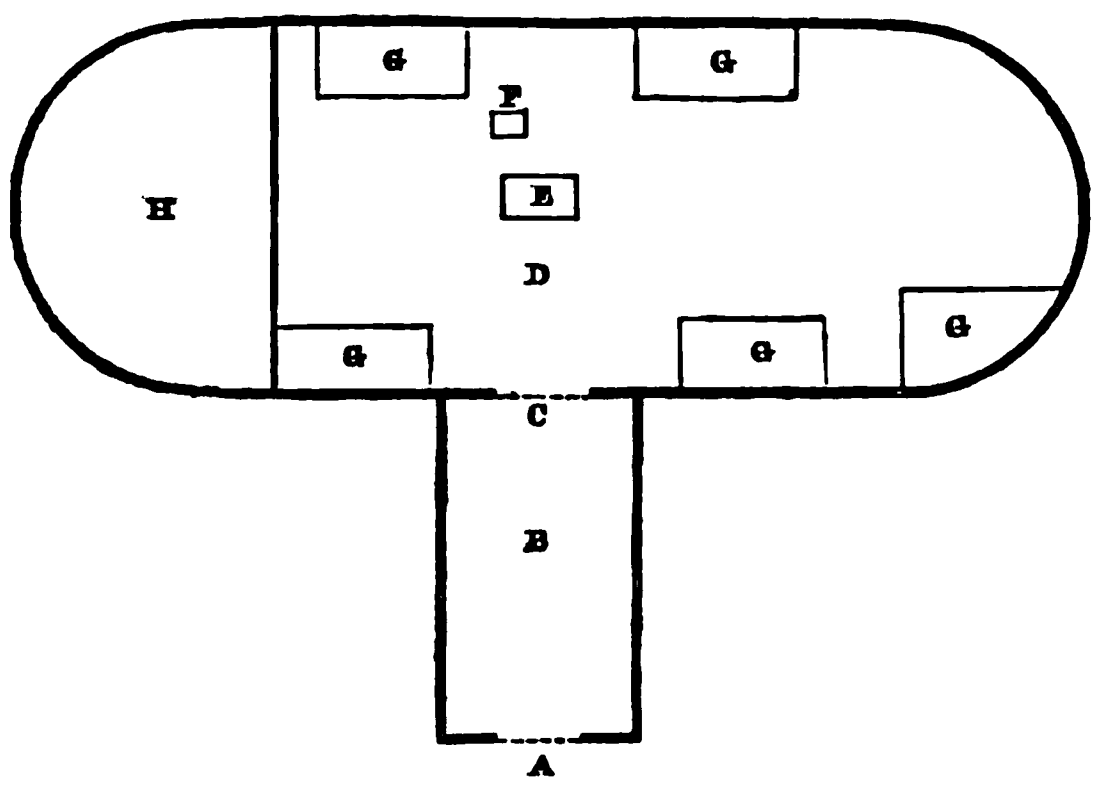
Fig. 141* represents the plan of a Laplander's gamme, or hut, at Komagfiord, as given by Mr. Brooke†. It was built of sods, supported by a rude framework, and the interstices were stuffed with moss. The greatest height was 6ft., the breadth 14ft., the whole length 30ft. A is the door; B, the passage, 3ft. high, 6ft. broad, and 12ft. in length; C is the inner door,

* Voyages to the Pacific Ocean, vol. ii. p. 450. See also vol. iii. p. 374.

† Brooke's Travels in Lapland, p. 318.

opening into the gamme, D; E, the fire-place, composed of a few large stones to confine the wood-fire; F, an opening in the roof to let out the smoke; G, G are sleeping divisions, which serve also to support the roof; H is a portion fenced off for the sheep and goats. A comparison of this hut with the corresponding plan of a tumulus (fig. 143) will show how closely these dwellings appear to agree with

Fig. 141*.



Laplander's Gamme, or Hut.

the "Ganggraben:" indeed, it is possible that in some cases ruined dwellings of this kind have been mistaken for sepulchral tumuli*; for some mounds have been examined which contained broken implements, pottery, ashes, etc., but no human bones; in short, numerous indications of life, but no trace of death. We know, also, that several savage tribes have a superstitious reluctance to use any thing which has belonged to a dead person; in some cases this applies to his house, which is either deserted or used as a grave. The Indians of the Amazons bury their dead under their houses, which, however, are not therefore abandoned by the living.

Among the New Zealanders, on the contrary, according to

* The so-called "Pond-barrows" perhaps belong to this class.

Mr. Taylor, "when the owner died, and was buried in his house, it was left with all it contained: the door was tied up and painted with ochre, to show it was made tapu, and then no one ever entered it again*." In many villages, he says, nearly half the houses belonged to the dead.

The islanders of Torres Straits also used the ordinary huts as dead houses†.

Denham‡ also states that in the great central African kingdom of Bornou "every one is buried under the floor of his own house, without monument or memorial; and among the commonalty the house continues occupied as usual, but among the great there is more refinement, and it is ever afterwards abandoned." The same is the case with the Dahomans, Yorubans, and other races of the Gold Coast§. It is still more significant that the Esquimaux themselves frequently leave the dead in the houses which they occupied when alive‖. Nor can any one compare the plan of a Scandinavian "passage grave," as, for instance, the one represented in fig. 143, with any drawing (see fig. 141*) of an Esquimaux snow house, without being struck with the great similarity existing between them.

Under these circumstances, there seems much probability in the view advocated by Professor Nilsson, the venerable archæologist of Sweden, that these "Ganggraben" are a copy, a development, or an adaptation, of the dwelling-house; that the ancient inhabitants of Scandinavia, unable to imagine a future altogether different from the present, or a world quite unlike our own, showed their respect and affection for the dead, by burying with them those things which in life they had valued most: with women their ornaments, with warriors

* New Zealand and its Inhabitants, p. 101.

† M'Gillivray, Voyage of the Rattlesnake, vol. ii. p. 48.

‡ Travels in Africa, vol. iv. pp. 55–130.

§ Burton's Mission to Dahome, vol. ii. p. 2.

‖ Ross' Arctic Expedition, 1829–1833, p. 290.

their weapons. They buried the house with its owner, and the grave was literally the dwelling of the dead. When a great man died, he was placed on his favourite seat, food and drink were arranged before him, his weapons were placed by his side, his house was closed, and the door covered up; sometimes, however, to be opened again when his wife or children joined him in the land of spirits.

It is just possible that the comparative rarity of chambered tumuli in England and France may be connected with the greater mildness of the climate, which did not necessitate the use of underground "winter-houses;" or it may be an indication of a difference in race. Further investigations will, doubtless, decide this point. In the meantime we must remember that the so-called "Picts' Houses" are abundant in the northern parts of Great Britain. These curious dwellings are "scarcely distinguishable from the larger tumuli; but on digging into the green mound, it is found to cover a series of large chambers, built generally with stones of considerable size, and converging towards the centre, where an opening appears to have been left for light and ventilation. These differ little from many of the subterranean weems, excepting that they are erected on the natural surface of the soil, and have been buried by means of an artificial mound heaped over them *."

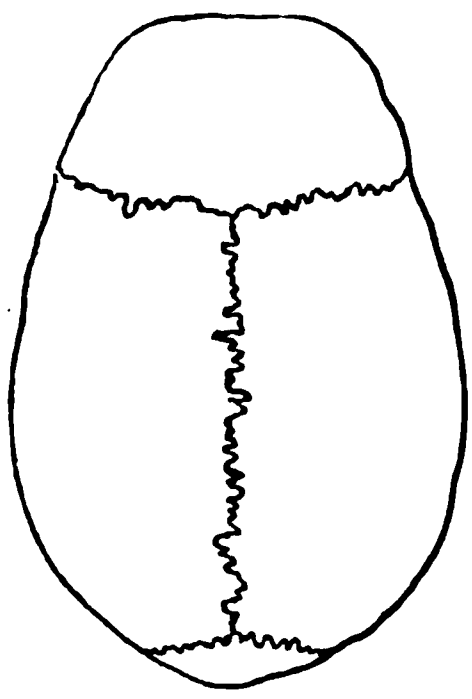
According to Mr. Bateman, who has recorded the systematic opening of more than four hundred tumuli (a very large proportion of which were investigated in his presence), and whose opinion is, therefore, of great value, "the fundamental design of them (i. e. the British tumuli), with the exception of the very few chambered or galleried mounds in Berkshire, Gloucestershire, Wiltshire, Ireland, etc., as New Grange, Wayland Smith's Cave, Uleybury, and others, and those of the much later Saxon period, is pretty nearly

* Wilson, l. c. vol. i. p. 116.

the same in most places; the leading feature of these sepulchral mounds is, that they enclose either an artless stone vault, or chamber, or a stone chest, otherwise called a Kistvaen, built with more or less care; and, in other cases, a grave cut out more or less below the natural surface, and lined, if need be, with stone slabs, in which the body was placed in a perfect state, or reduced to ashes by fire*."

The "long" tumuli of Great Britain resemble, in some respects, the Scandinavian "Ganggraben," and, like them, in districts where large blocks of stones occur, contain megalithic chambers, in which the dead were buried and not burnt. No trace of metal has yet been found in this class of tumulus; which therefore probably belongs to the Stone Age. The skulls found in these tumuli are very long and narrow skulls, which have received from Dr. Wilson the name of "Kumbecephalic," or boat-shaped skulls, resembling the one in fig. 142, which was obtained by Mr. Bateman from the tumulus known as "Longlow," near Watton, in Derbyshire. This tumulus contained the remains of thirteen individuals who had been buried in the usual contracted position. They were contained in a cist composed of large stones, and were accompanied with several worked flints, including three carefully made arrow-heads. Long skulls are comparatively rare in the round tumuli of England, while on the contrary, no round skulls have yet been met with in the long tumuli, at any rate in Wiltshire and Gloucestershire: so that the evidence appears to support Dr. Thurnam's aphorism, Long barrows, long skulls, round barrows, round skulls †. This conclusion rests on the measure-

Fig. 142.



Long Skull.—Derbyshire.

* Bateman, Ten Years' Diggings, p. xi.

† Mem. Anthropological Soc. vol. i. The following facts, however, are

ments of 137 skulls, 70 from round barrows and 67 from long ones, and it must be observed that these are not selected specimens, but so far as the long barrow skulls are concerned, comprise the whole number which we possess in a sufficiently perfect condition, while as regards the 70 from round tumuli, Dr. Thurnam has taken the whole number (41) contained in the Bateman collection, those described in the Crania Brittannica, and all those in his own collection. It is important to observe, therefore, that in neither case has any selection been made which could influence the results. Now if we class those skulls in which the relation of the breadth to the length is less than 73 to 100 as long heads or Dolichocephalic, those in which it is from 74–79 to 100 as medium heads, and those in which the proportion is 80 or more than 80 to 100 as short heads, or Brachycephalic, we shall have the following result:—

	Total number of skulls.	Dolichocephalic 63–73.	Orthocephalic 74–79.	Brachycephalic 80–89.
Long barrows	67	55	12	0
Round barrows	70	0	26	44

Thus there is not a single long head among the 70 specimens from round barrows, nor a single round head among the 67 specimens from long barrows. So remarkable a distinction certainly appears to imply a difference of race, and Dr. Thurnam is disposed to refer the Dolichocephalic people to the Neolithic Age, the Brachycephalic to that of Bronze.

As yet, no bone belonging to any of the extinct mammalia has been found in a tumulus. Even the reindeer, so far as our present evidence goes, is entirely wanting. Again, the stone implements, as already mentioned, are of a character very different from those used by Palæolithic men. It is

mainly taken from his second paper (in the memoirs of the same Society), of which Dr. Thurnam has been so kind as to forward me the proofs.

therefore not surprising to find that the skulls which have been obtained from tumuli attributed to the Stone Age indicate that Europe was, even at that period, already inhabited by more than one race of men. On the Continent, as in England, some are brachycephalic, or short-headed, and so far resemble those of the Lapps, while others are dolichocephalic, or long-headed* (fig. 142). Virchow† has recently published a memoir on the skulls obtained from Danish tumuli, and contained in the Copenhagen Museum. Omitting fragmentary specimens, and those belonging to young persons, he has examined 41 skulls referred to the Stone Age, 3 to the Bronze Age, and 5 to the Iron Age, and compared them with the specimens of Lapp (6), Greenland (5), and Finn (3) skulls contained in the same collection. On the whole, these Stone Age skulls are orthocephalic, inclining to brachycephalism; the Bronze Age and Iron Age specimens are dolichocephalic, but it must be remarked that it would not be safe to draw any definite conclusion from so small a number of specimens; and that even if the Bronze Age indicates the immigration of a new race into Western Europe, they would probably not exterminate the earlier inhabitants, but would at any rate spare the young women, so that, until we have a considerable body of evidence, it would be very unsafe to speculate on the character of the population during the Bronze Age.

The Greenlanders are dolichocephalic, the Lapps and Finns, on the contrary, brachycephalic; but Virchow observes that if, in this respect, the skulls of the latter resemble the type of the Danish Stone Age, they differ greatly in height and breadth, so that no ethnic affinity can be predicated between them.

In some cases the skulls obtained from one and the same tumulus differ from one another very considerably. Thus

* Nilsson's Stone Age. English ed. p. 121.

† Ar. für Anthropologie. 1870, p. 55.

among those found in the great tumulus at Borreby, in Denmark, the breadth, taking the length at 100, varied from 71·8 to 85·7, or no less than 14 per cent*.

The care with which the dead were interred, and the custom of burying implements with them, have been regarded by some archæologists as proving the existence of a belief in the immortality of the soul, and in a material existence after death. "That the ancient Briton," says Dr. Wilson †, "lived in the belief of a future state, and of some doctrine of probation and of final retribution, is apparent from the constant deposition beside the dead, not only of weapons, implements, and personal ornaments, but also of vessels which may be presumed to have contained food and drink. That his ideas of a future state were rude and degraded, is abundantly manifest from the same evidence."

But it is very far from being "constantly" the case, that the dead were so well supplied with what we call the necessaries of life; indeed, it is quite the exception and not the rule,—so that if we are to apply the evidence of the tumuli in this manner, we must, I think, come to a conclusion exactly the reverse of that stated by Dr. Wilson. Thus, out of more than 250 interments described by Sir R. Colt Hoare in the first volume of his great work on Ancient Wiltshire, only 18 had any implements of stone, only 31 of bone, 67 of bronze, and 11 of iron; and while pottery was present in 107, more than 60 of these contained only sepulchral urns, intended to receive the ashes of the dead, and certainly never meant to hold food. So far, however, as stone implements are concerned, I must confess that Sir R. C. Hoare appears to have overlooked the ruder instruments and weapons. I will, therefore, rely principally on the evidence afforded by the researches of Mr. Bateman and Mr. Greenwell.

* Busk. Vogt's Lectures on Man, p. 384. † l. c. vol. i. p. 498.

Although a large number of the interments described by Mr. Bateman had been already examined, there were 297 which had not been previously disturbed, and though he carefully mentions even the rudest bit of chipped flint, no less than 100 of these were without any implement at all, either of stone or metal, and the drinking-vessels and food-vases were only about 40 in number. Moreover, lest it should be supposed that these ill-provided interments were those of poor persons or enemies, we will leave all these out of consideration. This we can easily do. We may be sure that these tumuli, which must have required much labour, were only raised in honour of the rich and the great; though they may have served, and, no doubt, often did serve afterwards, as burial places for the poor. But it is almost always easy to distinguish the primary interment; for though there are some few cases in which the original occupant has been ignominiously ejected from his grave to make room for a successor, these instances are rare, and can generally be detected, while the secondary interments are usually situated either above the first, or on the sides of the tumulus. The same feeling which made our ancestors prefer to bury their dead in a pre-existing tumulus, generally prevented them from desecrating the earlier interments.

In the following tables, then, I have recorded the primary interments only; the first column contains the name of the tumulus, the succeeding nine indicate the disposition of the corpse, and the articles found therewith, while the last is reserved for any special remarks. Out of 139 interments examined by Mr. Bateman, only 105 had any implements or weapons, and only 35 were accompanied by any pottery that can have held either food or drink. Moreover, if we examine the nature of the implements which were deposited with the dead, we shall find that they are far from representing complete sets of tools or ornaments. The rarity of bronze in

tombs is, perhaps, not surprising; but to men so practised as our predecessors, it must have been an easy matter to make a rude arrow-head, or a flint flake. Yet some of the corpses are accompanied by but one single arrow-head, others by a small flint flake; some, again, by a single scraper. It must also be observed that many of the stone objects found by Mr. Bateman are much ruder than might be supposed from the names he has given them.

PRIMARY INTERMENTS.

BATEMAN'S VESTIGES OF THE ANTIQUITIES OF DERBYSHIRE.

	CORPSE.				OBJECTS OF					CIST.	REMARKS
	CONTRACTED.	BURNT.	EXTENDED.	POSITION UNCERTAIN.	STONE.	BONE.	BRONZE.	IRON.	POTTERY.		
1 Gib Hill	—	—	—	—	Arrow-head and celt	—	—	—	—	—	Large tumulus, 18 ft high. Pieces of burnt flint. Iron fibula near the surface.
2 Middleton Moor	—	—	—	—	Circular instrument	—	—	Arrow-head	—	—	Two skeletons.
3 Lark's Low	—	—	—	—	—	—	—	—	—	Cist	
4 Bee Low	—	—	—	—	—	Pin	—	—	Fragments	—	
5 Liff's	—	—	—	—	Two arrow heads, 2 chisels, 2 spear-heads, 2 knives, etc.	Hammer of horn	—	—	Incense cup	Cist	Three bits of red ochre.
6 Broadington Moor	—	—	—	—	Lance-head and two circular instruments	—	—	—	Fragments	Cist	
7 Elk Low	—	—	—	—	Lance-head and three other instruments	—	—	—	—	Cist	Sandstone polisher. With burnt human bones
8 Cross Low	—	—	—	—	Bit of a celt and of a chipped flint	—	—	—	Sepulchral urn	Cist	With burnt bones of two children and a horse's tooth.
9 Sliper Low	—	—	—	—	—	—	—	—	Drinking cup	Cist	Child.
10 Cross Low	—	—	—	—	—	—	—	—	—	Cist	With burnt human bones, and the skeleton of a child. Tumulus only about 18 in. high.
11 Green Low	—	—	—	—	Dagger, 3 arrow-heads, etc.	Three instruments	—	—	Drinking cup	Cist	With the remains of an infant. Piece of iron pyrites.
12 Sheldon	—	—	—	—	Flint chippings	—	—	—	Sepulchral urn	—	
13 Arbor Low	—	—	—	—	Kidney-shaped instrument	Pin	—	—	Two urns	Cist	Piece of spherical iron pyrites.
14 New Inns	—	—	—	—	—	—	Dagger	—	—	Cist	
15 The Low	—	—	—	—	—	—	—	—	—	Cist	Very small and low barrow.
16 Net Low	—	—	—	—	Two rude instruments	—	Dagger & 2 pins	—	—	—	Two ornaments of Kimmeridge coal, and fragments of calcined flint.
17 Wetton	—	—	—	—	One instrument	—	—	—	Urn	Cist	Burnt human bones.
18 Bostern	—	—	—	—	Two rude instruments	—	—	—	—	Cist	
19 Harthill Moor	—	—	—	—	—	—	—	—	Pieces	Cist	Small barrow.
20 Castern	—	—	—	—	Spear-head	—	—	—	—	Cist	
21 Moot Low	—	—	—	—	Six rude instruments	—	Box, etc. Knives	—	—	—	Glass beads, silver needle.
22 Gratton Hill	—	—	—	—	—	—	—	—	Fragments	Cist	Horses' teeth.
23 Bassett Wood	—	—	—	—	—	—	—	—	—	Cist	This was a large barrow.
24 Ham	—	—	—	—	—	—	—	—	—	Cist	Skeleton of a dog. Large barrow.
25 Ham	—	—	—	—	—	—	Pin	—	Fragments	Cist	Head of a bull. Large barrow.
26 Ham	—	—	—	—	—	—	—	—	—	Cist	Small barrow.

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		CORPSE.				OBJECTS OF					CIST.	REMARKS.
		CONTRACTED.	BURNT.	EXTENDED.	POSITION UNCERTAIN.	STONE.	BONE.	BRONZE	IRON.	POTTERY.		
37	Minning Low	...		...	...	Some good flints	Implement	Dagger...	...	...	...	
38	Ballidon Moor		...	...	...	One poor flint only	...	...	...	...	Cist	
39	Hill Head	...	...	...		Thin instrument	...	Awl	...	...	Cist	The grave contained three skeletons of men, besides other animals' bones.
30	Vincent Knoll		...	...	...	Good instrument, etc	...	...	...	...	Cist	
31	Brushfield	...	...		...	...	...	...	Sword, etc.	...	Cist	
32	Taddington	...	...		...	...	...	...	...	...	Cist	Probably a late interment. Small barrow.
33	Stakor	...	...	...	...	...	...	Two pieces	...	Drinking cup...	Cist	
34	HobHurst'sHouse	...		...	...	...	...	...	...	...	Cist	Or sepulchral chamber.
35	Hole Hill	...	...		...	Rude instrument	...	...	...	...	...	In gravel.
36	Foremark	...	...		...	...	...	...	Pin	...	...	
37	"	...	...		...	...	...	...	Bit	...	...	
38	"	...	...		...	...	...	...	...	...	...	Perhaps Saxon.
39	"	...	...		...	...	...	...	...	...	...	
40	"	...	...		...	...	...	...	...	...	...	
41	Smerrill	...	...		...	Flake and knife	...	...	...	...	Cist	Primary, but not sole. Female.
42	"	...	...		...	Dagger, spear, etc.	Bone netting rule	...	...	Drinking cup...	Cist	
43	Chelmorton	...	...	...		...	...	...	Knives, etc	...	...	
44	Haddon Field	...		...	...	Arrow-head, etc.	Mesh rule	Awl	...	Drinking cup...	...	
45	Throwley	...	...		...	Arrow-head	...	...	...	...	...	
46	Mare Hill	...	...	...	...	Spear-head	...	...	...	...	Cist	Two skeletons. Bit of pottery.
47	Deepdale	...		...	...	Arrow-head	...	Dagger...	...	...	Cist	
48	Mouse Low	...		...	...	Spear-head and 4 arrows	Two implements	...	...	Drinking cup...	Cist	
49	Thorncliff	...	...	...	...	A neat instrument	...	Dagger...	...	...	...	
50	Stanton	...		...	...	A few bronze implements	...	...	...	...	Cist	Two skeletons. Bit of pottery.
51	Ribden Low	...	...		...	Several implements	Several implements	...	...	...	Cist	
52	Throwley	...	...	...		Two pointed flints	Rude implement	Pin	...	Incense cup ...	Cist	With burnt bones.
53	Lomberlow	...		...	...	Spear-head	...	...	...	...	Cist	
54	Gateham	...	...		...	Chipped instrument	...	...	...	Sepulchral urn	...	
55	Bunster	...		...	...	Arrow-head	...	...	...	...	...	
56	Grablow	...		...	...	Two arrow heads	...	...	...	...	...	With burnt human bones.
57	Throwley	...	...		...	Spear head and basaltic axe	Several implements	Awl	...	Sepulchral urn, upright	...	
58	Bleau	...	...	...		Arrow-head	Pin	Bits	...	...	...	Some instruments of flint found in the earth above the interment.
59	Wetton	...	...	...		Two neat pointed instruments	Pin	...	...	...	Cist	Part of a vase.
60	Waralow	...	...	...	...	Three instruments	...	...	...	...	...	Two skeletons of young men.
61	"	...	...	...		Spear head and oval instrument	...	...	...	...	...	
62	Scrip Low	...	...	...		Broken instrument	...	...	...	...	...	Surrounded by sandstones. Two small pieces of pottery.
63	Lady Low	...	...	...		...	...	Dagger ...	...	...	...	

64	Ecton Hill	...	...	—	...	..	...	Round flint	...	...	...	...	...	...	...	...	Surrounded by six other contracted skeletons, which were accompanied by three rude flints.
65	Gastern	...	...	...	..	—	...	Several instruments	..	...	...	Armilla.	...	...	...	...	..	...	
66	Elkstone	...	...	—	...	...	...	A few instruments	..	...	...	Awl	...	...	...	...	...	...	Burnt human bones
67	,,	...	...	—	...	...	...	... ...	..	...	...	...	...	...	...	...	...	Cist	Cist not entirely excavated. Tumulus only one foot high
68	Calton Moor	...	...	—	...	...	...	... .	..	...	...	...	..	...	...	...	..	...	Arrow-head, etc., found in the Tumulus.
69	Ecton Hill	...	...	—	...	...	...	Two instruments	...	...	...	...	...	...	...	...	...	...	
70	Cold Eaton	...	...	—	...	...	...	... ...	..	Two combs	...	...	Fragments	...	...	...	...	Cist	Twenty-eight convex objects of bone, like button moulds.
71	Wyaston	...	...	...	...	...	—	... ...	...	...	..	...	...	...	Beads	...	...	...	Saxon lady, ring and earring of silver, brooch and necklace of amber, porcelain, and glass. Only the teeth remaining.
72	Pickering	...	...	...	—	...	...	Arrow-head	...	...	...	...	...	...	Vase	...	...	...	
73	Bainstaff	...	...	...	—	...	...	... ...	...	Pin	..	...	...	...	Incense cup	...	...	Cist	
74	Cawthorn Camps		...	...	—	...	...	Spear-head	...	...	...	Dagger	...	...	... ...	...	...	Cist	Two skeletons.
75	,,		..	—	...	...	...	... ...	...	...	...	...	...	...	Vase	...	...	Cist	
76	Girdle Tap	...	...	...	—	...	...	Two instruments	..	...	...	...	..	...	Sepulchral urn			...	
77	Pickering	...	...	—	...	...	...	Several instruments	...	...	...	...	...	...	Drinking cup with handle			...	
78	,,	...	...	—	...	...	...	Several instruments, including a spear-head	...	...	...	...	...	...	Thick vessel	...		Cist	With the skeleton of an infant.
79	,,	...	...	...	...	—	...	Two lance-heads and one round-ended	...	...	...	...	...	...	Vase	...	...	Cist	
80	,,	...	...	...	—	...	...	Spear-head	...	...	...	...	...	...	... ...		..	...	Bits of an urn.
81	,,	...	..	...	...	...	—	Spear-head	...	...	...	...	...	...	Vase	...	...	Cist	
82	,,	...	...	...	—	...	...	... ...	..	...	...	...	...	...	Vessel	...	...	Cist	
83	,,	...	...	...	...	...	—	Lance and arrow-head...	...	...	..	...	..	...	...	...	...	Cist	
84	,,	...	...	...	...	...	—	Spear-head	...	...	...	...	...	...	Vase	...	...	...	Jawbone of a sheep.
85	,,	...	...	...	...	...	—	Chisel and spear head ...	...	...	...	...	...	...	...	...	...	Cist	
86	,,	...	...	...	...	...	—	Lance, arrow-head, and circular instrument	...	...	...	...	...	...	...	...	...	Cist	
87	,,	...	...	...	—	...	...	Two indifferent instruments	...	...	...	...	...	...	Incense cup	...	...	...	
88	,,	...	...	...	...	...	—	Spear-head, arrow-head, and hammer	...	...	...	...	...	...	... ...		...	Cist	Head of a goat.
89	,,	...	...	...	—	...	...	Two spears and round ended instrument	...	...	...	...	...	...	... ...		...	...	
90	,,	...	...	...	—	...	...	Spear head, etc. ...	...	...	...	...	...	...	Incense cup	...	...	...	
91	,,	...	...	...	...	...	—	Arrow head and rough instruments	...	...	...	...	...	...	Sepulchral urn			Cist	
92	,,	...	...	...	...	...	—	Cutting instruments ...	Graver	...	Dagger...	...	...	...	... ...		...	...	Two small balls of stone.
93	,,	...	...	—	...	...	...	Three pour flints ...	...	...	...	...	...	...	Vase	...	...	Cist	
94	,,	...	...	...	...	...	—	Twenty-one implements	...	...	...	...	...	...	... ...		...	Cist	
95	,,	...	...	...	...	...	—	Four instruments ...	...	...	...	...	...	...	... ...		...	Cist	
96	Allerston Warren		...	—	...	...	—	Five flints	...	...	...	...	...	...	Vase	...	..	...	
97	Pickering	...	...	...	—	...	...	Knife	...	...	...	...	...	...	Incense cup	...		...	
98	,,	...	..	...	—	...	...	Spear-head	...	...	...	...	...	...	Vase ..	...		Cist	
99	Allerston Warren		...	—	...	...	...	... ...	..	...	...	...	...	...	Incense cup	...		...	
100	Gib Hill	...	...	—	...	...	...	Round instrument	...	...	...	...	...	...	Very pretty vase			Cist	Mound not originally sepulchral.
101	Benty Grange	...	...	...	...	—	...	... ...	..	...	...	...	Many things		...	...	...	...	Saxon; hair only remaining; leather drinking cup.
102	Crenkstone	...	—	...	...	...	...	Circular instrument	...	...	...	...	...	...	...	...	...	Cist	With burnt bones, apparently deposited at the same time.

CONTENTS OF TUMULI EXAMINED BY THE REV. W. GREENWELL.

	CORPSE.		OBJECTS OF				GRAVE OR CIST.	REMARKS.
	CONTRACTED	BURNT.	STONE.	BONE.	BRONZE.	IRON.	POTTERY.		
NORTH RIDING.									
1 Egton Moor, I.	...	—	...	...	...	...	Food vessel	...	The deposit of bones three feet above the natural surface.
2 ,, II.	...	—	...	...	...	...	...	...	The deposit of bones four feet above the natural surface
3 Hambleton	...	—	...	...	...	...	Cinerary urn	...	Upon the natural surface.
4 Grimston Moor, I.	...	—	...	...	...	...	...	Shallow grave	
5 ,, II.	...	—	...	...	...	...	Incense cup	Shallow grave	
6 ,, III.	...	—	...	...	...	...	Food vessel	Shallow grave	
7 Castle Howard, I.	...	—	...	...	...	...	...	...	Deposit of bones upon the natural surface.
8 ,, II.	...	—	...	...	...	...	...	...	Deposit of bones upon the natural surface.
9 ,, III.	...	—	...	...	...	...	Small urn	Shallow grave	
10 ,, IV.	...	—	...	...	...	...	Incense cup	Shallow grave	
11 ,, V.	...	—	...	...	...	...	Cinerary urn	...	Upon the natural surface.
12 ,, VI.	...	—	...	...	...	...	...	Shallow grave	
13 ,, VII.	...	—	...	...	...	...	Incense cup	Shallow grave	
14 ,, VIII.	...	—	...	...	...	...	Two incense cups	Shallow grave	
15 ,, IX.	...	—	...	...	...	...	Incense cup	Shallow grave	
16 ,, X.	...	—	Round scraper of flint unburnt	...	...	...	...	Shallow grave	
17 Wykeham Moor, I.	...	—	Two pieces of flint, burnt	...	...	...	Small urn	...	Deposit of bones upon the natural surface.
18 ,, II.	...	—	...	...	...	...	Small urn	Shallow grave	Square trench round the base of the barrow.
19 ,, III.	—	...	Large flint knife	...	Dagger	...	...	...	On the natural surface.
20 ,, IV.	...	—	Piece of flint, burnt	...	...	...	Two cinerary urns, one covered by a third urn	...	The urns on the natural surface, and surrounded by a circle of stones, set on edge, four feet in diameter.
21 ,, V.	...	—	Piece of flint, burnt	...	...	...	...	Shallow grave	
22 ,, VI.	...	—	Four pieces of flint, burnt	...	...	...	...	Shallow grave	
23 ,, VII.	...	—	Javelin head, burnt	...	...	...	Cinerary urn with a smaller one within it	...	On the natural surface.
24 ,, VIII.	...	—	Piece of flint, burnt	...	...	...	Cinerary urn	...	On the natural surface.
EAST RIDING.									
25 Kirby Underdale	...	—	...	...	...	...	...	Deep grave	Two shoulder blades of a boar in the grave.

26	Langton Wold	—	—	Flint flake	—	—	—	—	—	—	—	A man, on the natural surface, and, close to him, a woman; she had a jet bead, a piece of deer's tooth, pierced, a cerita pierced, a vertebra of a fish, and three cowries, at her waist.
		—	—	—	Two implements, one like the bow of a drill	Three awls	—	—	—	—	—	
27	Duggleby	—	—	—	—	—	—	—	—	—	—	Body on the natural surface.
28	Heslerton Wold	—	—	—	—	—	—	—	Grave	—	—	A child about three years old.
29	Sherburn Wold, I.	—	—	—	—	—	Food vessel	—	—	—	—	On the natural surface.
30	" II.	—	—	—	—	—	Food vessel	—	Deep grave	—	—	In this mound were the remains of a man and a woman, overlying a deposit of burnt bones. Probably a man, his wife and slave.
		—	—	—	—	—	Food vessel	—	Deep grave	—	—	
		—	Javelin head, burnt	—	—	—	—	—	—	—	—	
31	" III.	—	—	—	—	—	—	—	Shallow grave	—	—	
32	" IV.	—	—	—	—	—	—	—	Shallow grave	—	—	
33	" V.	—	Scraper and 5 chippings	—	—	—	—	—	—	—	—	On the natural surface.
34	" VI.	—	—	—	—	—	Urn	—	Shallow grave	—	—	In the grave was the body of a child touching the other body.
35	Potter Brompton Wold I.	—	Perforated axe, burnt	—	—	—	—	—	Deep grave	—	—	In the grave some broken human bones and some potsherds.
36	" II.	—	—	—	—	—	—	—	Shallow grave	—	—	
37	" III.	—	—	—	—	—	Food vessel	—	Deep grave	—	—	A man of middle age, at the east end, and at the west a young man.
		—	Arrow point of flint, barbed	—	—	—	—	—	—	—	—	
38	" IV.	—	—	Pin, burnt	—	—	Urn	—	Shallow grave	—	—	The urn laid on its side upon the bones.
39	" V.	—	—	—	—	—	—	—	—	—	—	Behind the head was the body of a very young child.
		—	—	Pin	—	—	—	—	—	—	—	
40	" VI.	—	—	—	Flat piece	—	—	—	Shallow grave	—	—	
41	" VII.	—	Long flint knife in the grave, but not with either the unburnt or burnt body	—	—	—	—	—	Deep grave	—	—	In the grave were the scattered remains of three bodies, and several fragments of a "drinking cup," and two feet above the bodies were the bones of a burnt body.
		—	—	—	—	—	—	—	—	—	—	On the natural surface.
42	Ganton Wold, I.	—	—	—	—	—	—	—	—	—	—	Five bodies were laid close together, and evidently buried at the same time.
43	" II.	—	—	—	—	—	Urn	—	Shallow grave	—	—	
		—	Oval scraper	—	—	—	—	—	—	—	—	On the natural surface.
44	" III	—	—	—	—	—	—	—	—	—	—	
45	" IV.	—	—	—	—	—	Food vessel	—	Deep grave	—	—	The body had been laid upon a wooden platform, which rested upon stakes.
46	" V.	—	—	Pin	—	—	—	—	Shallow grave	—	—	
47	" VI.	—	—	—	—	—	—	—	Deep grave	—	—	
48	" VII.	—	Oval scraper, burnt	—	—	—	—	—	Shallow grave	—	—	
49	" VIII	—	—	—	—	—	—	—	—	—	—	On the natural surface.
50	Willerby Wold, I.	—	—	—	—	—	—	—	Deep grave	—	—	
51	" II.	—	Two knives, & 4 flint chips	—	—	—	Food vessel	—	Deep grave	—	—	
52	" III.	—	—	—	—	—	—	—	Deep grave	—	—	In the grave the scattered bones of a body.
53	" IV.	—	—	—	—	—	Food vessel	—	—	—	—	On the natural surface.
54	" V.	—	—	—	—	—	Drinking cup	—	Shallow grave	—	—	
55	" VI.	—	—	—	—	—	—	—	Deep grave	—	—	A woman. At the other end of the grave was a man and three children, the bones of whom had been displaced and relaid in a sort of rude order.

		COPPER.		OBJECTS OF				GRAVE OR CIST.	REMARKS.
		CONTRACTED.	EXTEND.	STONE.	BONE.	BRONZE.	IRON.	POTTERY.		
56	Rudston	—	...	... ...	Club made from the antler of a red deer	... ...	... ...	Drinking cup...	Grave ...	In the grave were the remains of a disturbed body.
57	Butterwick, I.	—	...	Knife	... ...	Dagger, axe & drill	... ...	... ...	Deep grave...	Five large jet, and one stone, button.
58	,, II.	...	—	... ...	... ...	Awl	...	Cinerary urn ...	... ...	On the natural surface.
59	Weaverthorpe, I.	—	...	... ...	... ...	... ...	... ...	Food vessel ...	Grave ...	
60	,, II.	—	...	Large flake	... ...	... ...	... ...	... ...	Grave ...	A body cut through in making the grave.
61	,, III.	—	...	Knife and large flake ...	... ...	... ...	... ...	... ...	Deep grave...	
62	,, IV	—	...	... ...	... ...	... ...	... ...	Drinking cup...	... ...	On the natural surface.
63	,, V.	...	—	... ...	... ...	... ...	... ...	... ...	Shallow grave	Above the grave were three heads without lower jaws, carefully deposited in the form of Y.
64	,, VI.	—	...	... ...	... ...	... ...	... ...	... ...	Deep grave...	
65	,, VII.	—	...	Oval scraper or knife ...	Two tines of a red deer's antler, cut off.	... ...	... ...	... ...	Grave ..	Some disturbed bones of a child in the grave.
66	,, VIII.	—	...	... ...	... ...	... ...	... ...	Urn	Very shallow grave	Necklace of jet beads, 119 flat circular disks, and a triangular central pendant.
67	,, IX.	—	...	... ...	... ...	... ...	... ...	... ...	... ...	On the natural surface.
68	,, X.	—	...	... ...	... ...	Armlet, fibula.	Tongue of fibula replacing the broken bronze tongue	... ...	Very shallow grave	Necklace of blue glass beads, with a zig-zag pattern in white.
69	,, XI.	—	...	... ...	... ...	Armlet ...	... ...	... ...	Very shallow grave	Nos. 66-69 a small group, 66-67 women, 68-69 men. The armlets of "late Keltic type, and, like the necklace, similar to those found at Arras."
70	,, XII.	—	...	... ...	... ...	... ...	... ...	... ...	Very shallow grave	
71	,, XIII.	—	...	... ...	... ...	... ...	... ...	... ...	Very shallow grave	
72	,, XIV.	—	...	... ...	... ...	... ...	... ...	... ...	Grave ...	In the grave some burnt bones and unburnt bones of a child, all scattered, and several pieces of a "drinking cup."
73	,, XV	—	...	... ...	... ...	... ...	... ...	... ...	... ...	The two bodies were placed facing each other, and in a reverse position. The urn was between them.
74	,, XVI.	—	...	... ...	Hammer of red deer horn	... ...	... ...	Urn	Shallow grave	On the natural surface.
75	,, XVII.	—	...	Perforated axe, a round scraper of flint, and a flake	... ...	... ...	... ...	... ...	Deep grave...	Man - in the grave, some bones of a disturbed body.
		—	...	Two flint chippings ...	... ...	2 earrings	... ...	... ...	Deep grave...	Woman. The two graves joined by an

76 Weaverthorpe, XVIII.	—	...	Javelin head	... ...	... ...	... ...	... ...	Deep grave ...	
77 Enthorpe, I. ...	...	—	... ...	... ...	... ...	... ...	Urn	... ...	On the natural surface. Urn laid upon the bones.
78 ,, II. ...	...	—	... ...	... ...	... ...	... ...	Urn	... ...	On the natural surface. Urn laid upon the bones.
79 ,, III. ...	...	—	... ...	... ...	... ...	... ...	Two urns ...	... ...	Just above natural surface. Urns amongst the bones.
80 ,, IV. ...	...	—	... ...	... ...	... ...	... ...	Urn	... ...	Three feet above the natural surface.
81 ,, V. ...	—	...	... ...	... ...	... ...	... ...	... ...	Deep grave ...	
82 ,, VI. ...	...	—	... ...	... ...	... ...	... ...	... ...	Grave ...	
83 Gardham, I. ...	...	—	... ...	... ...	... ...	... ...	Cinerary urn ...	Shallow grave	
84 ,, II. ...	—	...	... ...	... ...	... ...	... ...	... ...	Shallow grave	
85 ,, III. ...	...	—	... ...	... ...	... ...	... ...	... ...	Shallow grave	
86 ,, IV. ...	...	—	... ...	... ...	... ...	... ...	... ...	Shallow grave	
WEST RIDING.									
87 Ferrybridge ...	—	...	... ...	Pin ...	... ...	... ...	Drinking cup...	Grave ...	
CUMBERLAND.									
88 Castle Carrock, I	—	...	... ...	... ...	... ...	... ...	Drinking cup...	Cist ...	Below the natural surface.
89 ,, II	...	—	Long and narrow knife, unburnt	... ...	... ...	... ...	... ...	Shallow grave	
WESTMORELAND									
90 Moor Divock ...	...	—	... ...	... ...	... ...	... ...	Food vessel ...	Grave ...	Stone circle round the base of the cairn.
91 Kirby Stephen, I.	...	—	... ...	... ...	... ...	... ...	Incense cup ...	Shallow grave	
92 ,, II.	...	—	... ...	... ...	... ...	... ...	... ...	... ...	On the natural surface.
93 ,, III.	—	...	... ...	... ...	... ...	... ...	... ...	Grave ...	
94 Warcop	—	...	... ...	... ...	... ...	... ...	... ...	... ...	On the natural surface.
95 Ashy	...	—	... ...	... ...	... ...	... ...	... ...	Shallow grave	Stone circle round the base of cairn.
NORTHUMBERLAND.									
96 Ford, I.	—	...	... ...	... ...	... ...	... ...	Food vessel ...	Cist ...	A very young child. Stone circle round the base of the barrow.
97 ,, II. ...	...	—	Fragment of flint, burnt	... ...	... ...	... ...	Cinerary urn ...	... ...	Fourjet beads. Deposit of bones on surface.
98 ,, III. ...	...	—	... ...	Fragment of pin	Pin ...	... ...	Cinerary urn ...	... ...	On the natural surface.
99 ,, IV. ...	...	—	Pointed oval knife? unburnt	... ...	... ...	... ...	... ...	Grave ...	
100 Chatton ...	...	—	Arrow-point, burnt	... ...	... ...	... ...	... ...	Grave ...	
101 Old Bewick, I	—	...	... ...	... ...	... ...	... ...	Food vessel ...	Cist ...	Below the natural surface. Stone circle round base of cairn
102 ,, II	—	...	Knife	... ...	... ...	... ...	... ...	Cist ...	Below the natural surface. Stone circle round base of cairn.
103 Chollerton ..	—	...	... ...	... ...	... ...	... ...	... ...	Cist ...	On the natural surface.

In the table with which Mr. Greenwell has been so good as to furnish me, and which shows the primary deposits in 102 tumuli examined by him, it will be observed that only thirty contained any implement, the other 72 being altogether bare. There is not a single case in which the corpse was deposited in that extended position which seems to us so natural.

Thus, then, there seems to have been no intention of depositing with each corpse a complete set of implements. The barrow on Cronkstone Hill, for instance, contained the skeleton of a man, with whom had been buried the burnt bones of some one, probably a slave, or, perhaps, a wife, who had been sacrificed at his grave, and yet the only implement found with him was a "circular instrument," probably a flint scraper or a sling-stone. Again, the mound known as "Cow Low" contained only a bone pin. The affectionate relatives who heaped up this tumulus would certainly not have sent their dead sister into the new world with nothing but a bone pin, if they had thought that the things they buried with her could be of any use. Even the great tumulus at Arbor Low contained only a bone pin, a piece of iron pyrites, a kidney-shaped instrument of flint, and two vases. It would be easy to multiply illustrations, and it is, I think, sufficiently evident that the articles found in the graves cannot seriously be considered as affording any evidence of a definite belief in a future state of existence, or as having been intended for the use of the dead in the new world to which they were going. Moreover, there is a well-marked speciality in each case, which seems to show that the presence of these rude implements, far from being the result of a national belief, are simply the touching evidence of individual affection.

In some few cases, again, small models of weapons have been found, in lieu of the weapons themselves. In modern Esquimaux graves small models of kajaks, spears, etc., are

sometimes buried, and a similar fact has been observed in Egyptian tombs. Mr. Franks informs me that much of the jewellery found in Etruscan tombs is so thin that it can scarcely have been intended for wear during life. In Japan those who are entitled to wear swords during life have wooden ones placed in their graves, as insignia of rank; and it has long been the custom in China to burn paper cuttings, or drawings, of horses, money, etc., under the belief that the objects so represented will be actually possessed by the deceased*.

We must always bear in mind that the ancient tumuli do not all belong to one period, nor to one race of men. No tumuli belonging to the Palæolithic period have yet been discovered, but this mode of burial appears to have existed in Northern and Western Europe from the Neolithic, or second Stone period, down to the introduction of Christianity. Indeed it was the examination of the tumuli which first induced Sir R. Colt Hoare, and other archæologists, to adopt for Northern Europe the division into three great periods. In Denmark, especially, there was supposed to be so sharp and well-marked a distinction between the tumuli of the Stone Age and those of the Bronze period, that the use of bronze might be considered as having been introduced by a new race of men, who rapidly exterminated the previous inhabitants, had entirely different burial customs, and were altogether in a much higher state of civilization. It was stated that the tumuli of the Stone Age were generally surrounded by a circle of great stones, and contained chambers formed of enormous blocks of stone; and that the dead were buried in a contracted or sitting posture, with the knees brought up under the chin, and the arms folded across the breast. On the contrary, the burial places of the Bronze Age were described as having "no circles of massive stones,

* See, for instance, Marco Polo's Travels. Edin. 1846, pp. 248-260.

no stone chambers; in general, no large stones on the bottom, with the exception of stone cists placed together, which, however, are easily to be distinguished from the stone chambers; they consist, as a general rule, of mere earth, with heaps of small stones, and always present themselves to the eye as mounds of earth, which, in a few rare instances, are surrounded by a small circle of stones, and certain relics of bodies which have been burnt and placed in vessels of clay, with objects of metal*."

Thus, therefore, the barrows of the Age of Bronze appeared to be distinguished from those of the earlier period, not only by the important fact that, "instead of the simple and uniform implements and ornaments of stone, bone, and amber, we meet, suddenly, with a number and variety of splendid weapons, implements, and jewels of bronze, and sometimes, indeed, with jewels of gold†;" but, also, because the construction of the tumuli themselves was different in the two periods; and the corpse which, in the Stone Age, was always buried in a contracted posture, was in the Bronze Age always burnt. Subsequent investigations, however, have furnished the Danish antiquaries rather with exceptions to, than confirmations of, this generalization; and, on the whole, it must be admitted that (though the passage-graves and long barrows seem always to belong to the Stone Age) we are not acquainted with any external differences by which the tumuli of the Stone, Bronze, and Iron Ages can, with certainty, be distinguished from one another. The contents of the graves are, however, more instructive. Eventually, no doubt, the human remains themselves, and especially the skulls, will prove our best guides; but, at present, we do not possess a sufficient number of trustworthy descriptions or measurements, to justify us in drawing any generalization from them,

* Worsaae's Primeval Antiquities, p. 93. † Ibid. p. 24.

excepting, perhaps, this, that the skulls found with bronze in some cases closely resemble those discovered in graves containing only stone implements; from which we may infer that, even if the use of bronze was introduced by a new and more civilized race, the ancient inhabitants were not altogether exterminated. The pottery does not at present help us much; that found in company with bronze is often coarse, ill-burnt, hand-made, and, in form, ornamentation, and material, closely agrees with that which occurs in graves containing stone implements only. We too often see that tumuli are referred to the Stone Age because they contain one or two implements made of that material. This, however, is a very unsafe deduction. We know that stone was extensively used throughout the Bronze Age; and, indeed, out of 37 tumuli in which Mr. Bateman found objects of bronze, no less than 29 contained also stone implements, many of which were extremely rude.

There are also cases in which it is evident that flint implements were deposited in graves rather in deference to ancient customs, than because they were still in every day use. Thus in the tumulus known as Kouloba, or "Hill of Cinders," near Kertch, a heap of sharp flints was found. This tumulus was of considerable size, and contained the remains of a chief, his wife, servant, and horse. He wore a cap ornamented with plates of gold, a gold enamelled necklace, and gold bracelets. His sword was of iron, the handle covered with leaves of gold embossed with figures of hares and foxes. His shield was also of gold, covered with heads of Medusa, etc. An electrum plate, which had formed part of a quiver, was also ornamented with figures of animals, such as a tiger seizing a goat, and a deer attacked by a griffin. Above the tail of the tiger was written *πορναχο*. Statuettes, bronze cauldrons, and many other things were deposited around.

The queen was also richly ornamented. The tumulus contained also a diadem of gold, a necklace of gold filagree, to which were suspended small bottles of fine gold; medallions of green and blue enamel; a magnificent vase in electrum; two gold bracelets; and six knives with ivory handles, besides many other gold ornaments. Many of these objects were ornamented with beautiful figures of animals. A mitre, for instance, had a plate of electrum, on which were represented four women in Greek costume, sitting in the midst of garlands of lotuses, the stalks of which served as seats and backs. The plate was attached to the mitre by four masks of lions, and the bottom of the mitre was bordered by a diadem of gold, adorned by small enamelled rosettes. In the same tumulus, under this tomb, was a second still richer one, from which no less than 120 pounds weight of gold jewellery are said to have been taken.

In such a tumulus as this, flint flakes could evidently have but a symbolical meaning *.

Evidently, therefore, the mere presence of a few implements of stone is in itself no sufficient reason for referring any given interment to the Stone Age. The following tabular statement of 297 interments, recorded by Mr. Bateman, will, however, I think, be found interesting:—

Implements.	CORPSE.				Total.
	Contracted.	Burnt.	Extended.	Position Uncertain.	
None	27	63	3	7	100
Stone.....	53	48	2	31	134
Bronze	15	10	5	7	37
Iron.....	2	3	14	7	26
Total.....	97	124	24	52	297

These interments are all from the counties of Derby,

* Journal of the British Archæological Association, vol. xiii.

Stafford, and York. In his work on ancient Wiltshire, Sir R. C. Hoare records the examination of 267 interments, which may be tabulated in a similar manner as follows :—

Implements.	CORPSE.				Total.
	Contracted.	Burnt.	Extended.	Position Uncertain.	
None	9	160	3	12	184
Stone.....	2	5	1	1	9
Bronze.....	4	49	2	8	63
Iron....	—	—	7	4	11
Total.....	15	214	13	25	267

We see that in this latter table nearly all the cases of bronze were in interments preceded by cremation, but in the northern interments the reverse is the case ; and, as regards Wiltshire, if we are to regard cremation as a test of the Bronze Age, we must refer almost the whole of these interments to that period. I confess that I am somewhat inclined to do so. No less than 270 tumuli cluster round Stonehenge, and it seems most probable that the dead were brought from a distance to lie near the great temple. In this case the great majority of the tumuli belong, therefore, to one period, that, namely, at which the temple was held sacred. Some few, indeed, may be referable to earlier or later times, but as out of 152 of these interments which were examined by Sir R. C. Hoare, no less than 39 contained objects of bronze, I am disposed to regard the whole group as belonging to the Bronze period. Now in these 152 cases the corpse was contracted in four only, and extended in three. In 16 the disposition of the corpse was not ascertained, and in no less than 129 it had been burnt.

If we combine the observations of Sir R. C. Hoare and Mr. Bateman, we shall obtain the following table :—

Implements.	CORPSE.				Total.
	Contracted.	Burnt.	Extended.	Position Uncertain.	
None	36	223	6	19	284
Stone.....	55	53	3	32	143
Bronze.....	19	59	7	15	100
Iron.....	2	3	21	11	37
Total...	112	338	37	77	564

Some of these interments were no doubt Anglo-Saxon; if these had been eliminated the argument would have appeared still stronger, but taking them as they are, out of 37 graves containing iron weapons or implements, the corpse was certainly extended in 21 cases, and, probably so, in several others; while, out of no less than 527 cases in which iron was not present, the corpse was extended only in 16, the proportion being at least $\frac{7}{12}$ths in one case, and only $\frac{1}{33}$rd in the other. On the whole we may certainly conclude that this mode of burial was introduced at about the same period as the use of iron.

As regards the habit of burning the dead, the evidence is less conclusive. Out of 100 cases, indeed, of graves characterized by the presence of bronze, the corpse appears to have been buried, in a contracted posture, 19 times only; in an extended position, only seven times. It is evident, therefore, that during the Bronze Age, the dead were generally burnt. It is true that there are many cases in which interments by cremation, if I may use such an expression, contain no weapons or objects of bronze. We know, however, that this metal must always have been expensive, and it is not unreasonable to suppose that many, if not most, of these interments may belong to the Bronze Age, although no objects of metal occurred in them.

There can be no doubt that in the Neolithic Stone Age it was usual to bury the corpse in a sitting or contracted

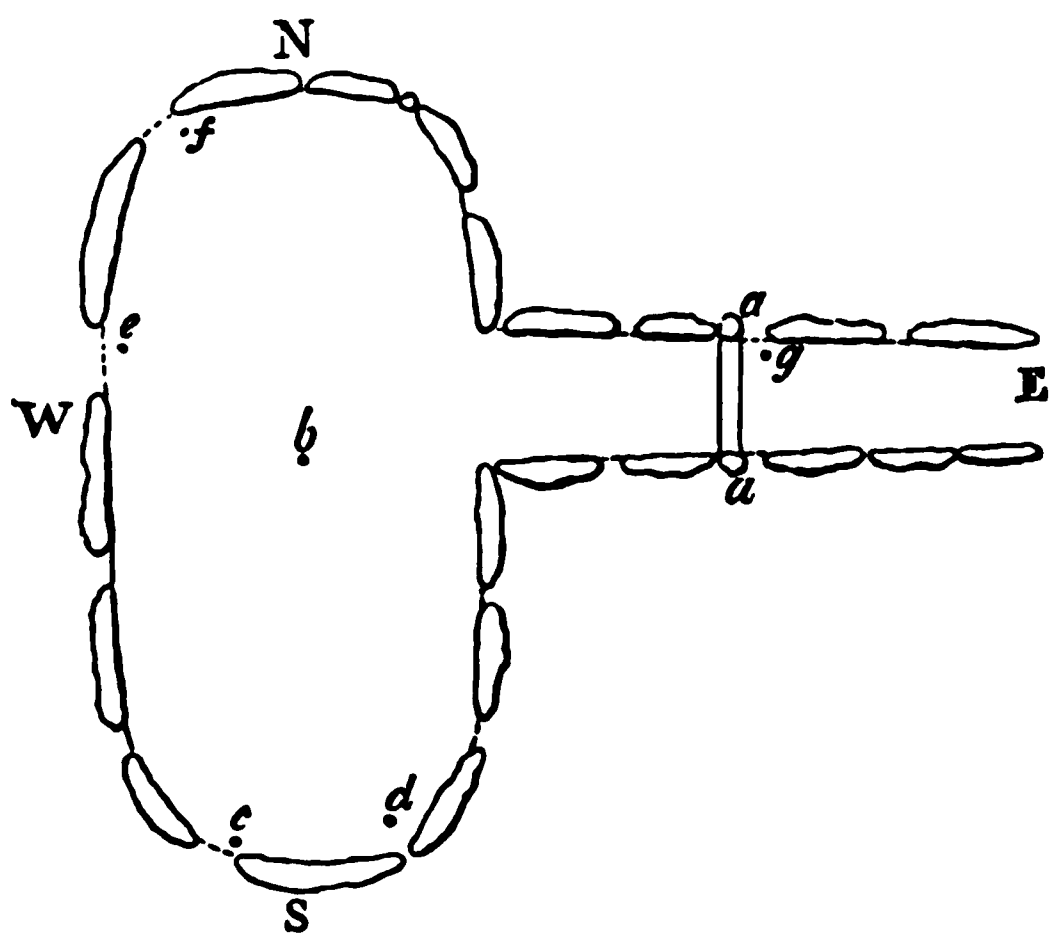
posture; and, in short, it appears probable, although far from being satisfactorily established, that in Western Europe this attitude is characteristic of the Stone Age, cremation of that of bronze; while those cases in which the skeleton was extended may be referred, with little hesitation, to the Age of Iron. At the same time it must be admitted that the evidence is very far from conclusive; and we must remember that in Anglo-Saxon times the dead were burned by some tribes, and buried by others.

But although the presence of a few flint flakes, or other stone implements, is certainly no sufficient reason for referring any given tumulus to the Stone Age, the case is different where a large number of objects have been found together; for instance, I have in my collection a group of stone implements consisting of 14 beautifully made axes, wedges, chisels, spear-heads, etc., and more than 60 capital flakes, which were all found together in one of the large Danish sepulchral chambers, on the island of Möen*, and have been described by M. Boye. The tumulus had a circumference of 140 ells, and a height of about eight ells. It is probable that it had been surrounded by a circle of stones, for M. Jensen, the owner, remembered that, many years before, the northern side had been surrounded by a row of stones standing close together. None of them, however, at present remain. Unfortunately M. Boye was not present when they began to remove the tumulus; still he thinks that the account given to him may be relied on with safety. M. Jensen began to dig on the east side of the Low, and the first thing which he came to was a jar, which he unfortunately broke. It contained burnt bones and a bronze pin, the head of which was ornamented with concentric lines. Towards the S.S.E. was found a cist, about an ell long, and formed of flat stones. In it were burnt bones, a bent knife, and a pair of pincers

* Annaler for Nordisk Oldkyndighed og Historie, 1858, p. 202.

two inches in length; both these objects were of bronze. Not far from this cist was another urn, containing burnt bones, with several objects of bronze, namely, a knife four inches in length, part of a small symbolical sword, and two fragments of an awl. It is evident that these three interments belonged to the Bronze Age, and also that they were secondary, that is to say, that they belonged to a later date than the original sepulchral chamber, over which the tumulus had been made.

Fig. 143.

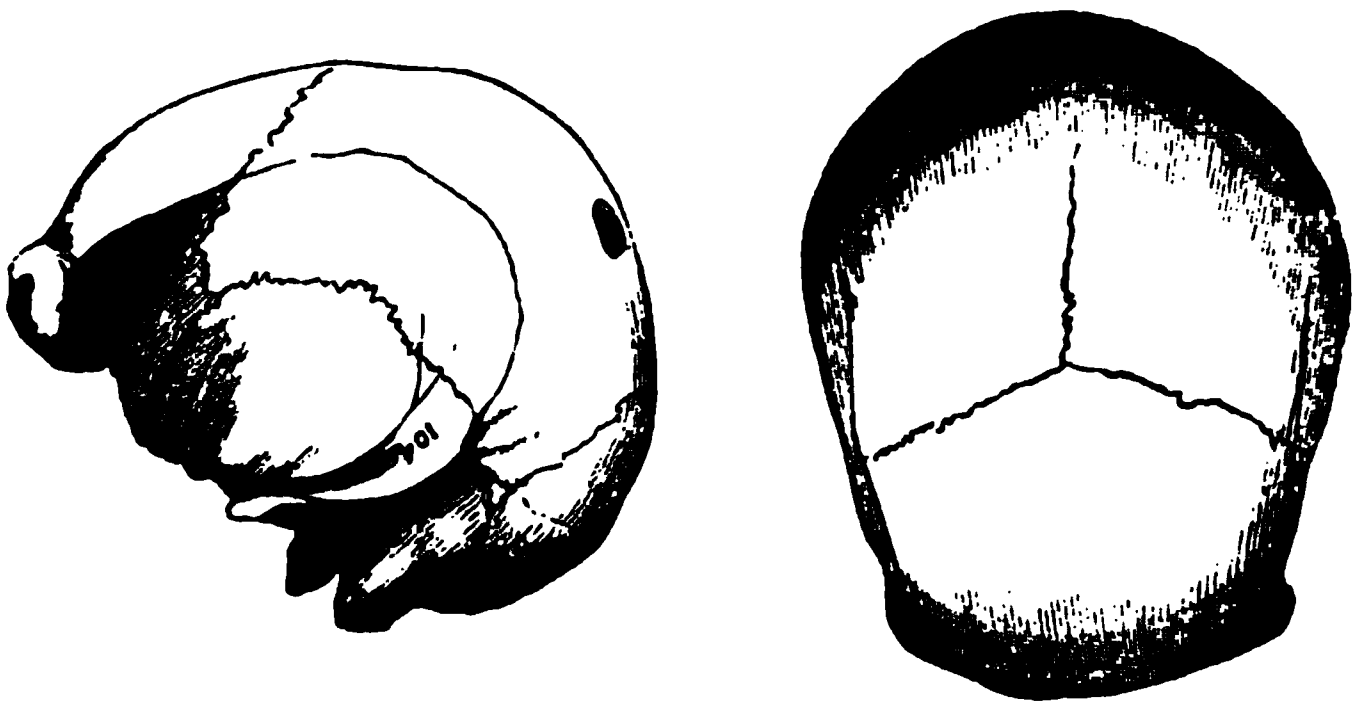


Plan of the Chamber in a Danish Tumulus in Möen.

The sepulchral chamber itself (fig. 143) lay north and south, was of an oval form, about eight and a half ells in length, and twenty and a half in circumference, and about two and a half in height. The walls consisted of twelve very large, unhewn stones, which, however, did not in most cases touch one another, but left intervals which were filled up by smaller stones. The roof was formed by five great blocks, the spaces between them being filled up by smaller ones. The passage, which was on the east side, was five ells

long and one ell broad, and was formed by eleven side stones and three roof stones. At the place (*a*) was, on each side, a smaller stone, which, in conjunction with another on the floor between them, formed a sort of threshold, probably indicating the place where the door stood. Similar traces of a doorway have been found in other Danish tumuli, and may, perhaps, be taken as evidence that the mounds had been used previously as houses; at the time of the interment the construction of a door would have been simply purposeless, the passage leading to it being filled up with rubbish. The chamber was filled up with mould to within

FIG. 144. FIG. 145.



Skull from a Danish Tumulus at Möen.

half an ell of the roof. About the middle, not far from the bottom, a skeleton was extended (at *b*), with the head towards the north. On the south side (at *c* and *d*) occurred two crania, each of which lay on a quantity of bones, indicating that the corpses had been buried in a sitting posture. At (*e*) was a similar skeleton, close to which were three amber beads, a beautiful flint axe, which did not seem to have been ever used, a small unfinished chisel, and some fragments of pottery, ornamented with points and lines. At (*f*) was another skeleton, in a similar position, with a flint flake, an amber bead, and some fragments of pottery. Figs. 144,

145, represent one of the skulls from this stone chamber. Several other skeletons were found sitting round the side walls, but they had unluckily been removed and thrown away before the arrival of M. Boye. With them were at least 20 different jars or urns, all of them inverted, and prettily decorated with points and lines.

Fig. 146.

View in the Chamber looking through the entrance.

Besides these objects, the earth in the chamber contained five flint spear-heads, a fragment of a flint spear which had been broken and worked up again, two small flint chisels, 53 flint flakes, varying from three to five and a half inches in length; 19 perfect, and 31 broken, amber beads, of which

the greater number were hammer-like, the rest tubular or ring-shaped. The passage was filled up by earth, mixed with fragments of pottery, and small stones. About the middle was a skeleton, with the head towards the east, at the side of which were five flakes and an amber bead. Close to the feet was a jar, unornamented, and much ruder than those found in the chamber itself. Not the smallest fragment of metal was found either in the chamber or in the passage.

Fig. 147. Fig. 148. Fig. 149.

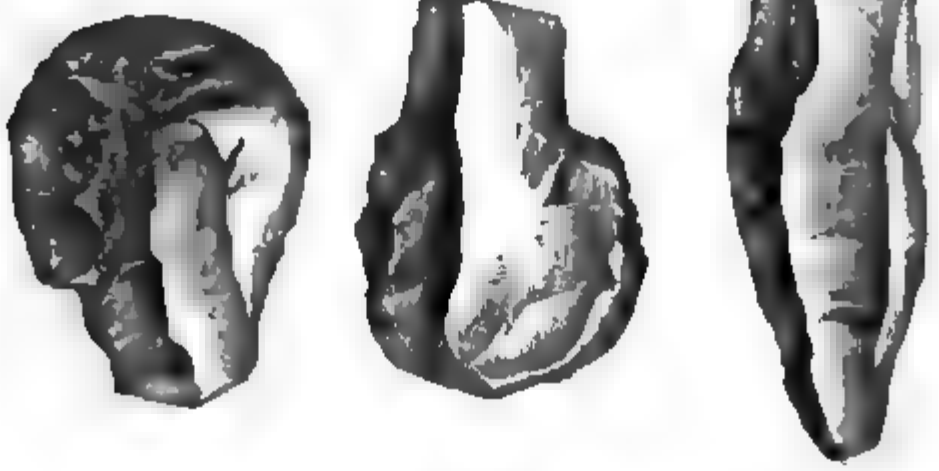
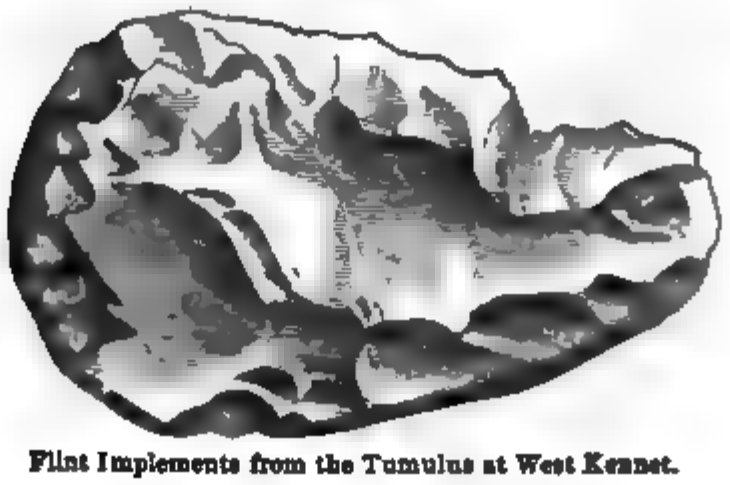


Fig. 150.



Flint Implements from the Tumulus at West Kennet.

Again, as a second case of the same sort, I may mention the Long Barrow (fig. 146) near West Kennet, in Wiltshire, described by Dr. Thurnam*. The tumulus in this case is 336 feet in length, 40 feet wide at the west end, and 75 feet at the east, with a height of eight feet. The walls of the

* Archæologia, vol. xxxviii. p. 405.

chamber are formed by six great blocks of stone, and it opens into a passage, so that the ground plan very closely resembles that of the tumulus just described, and, in fact, of

Fig. 151.

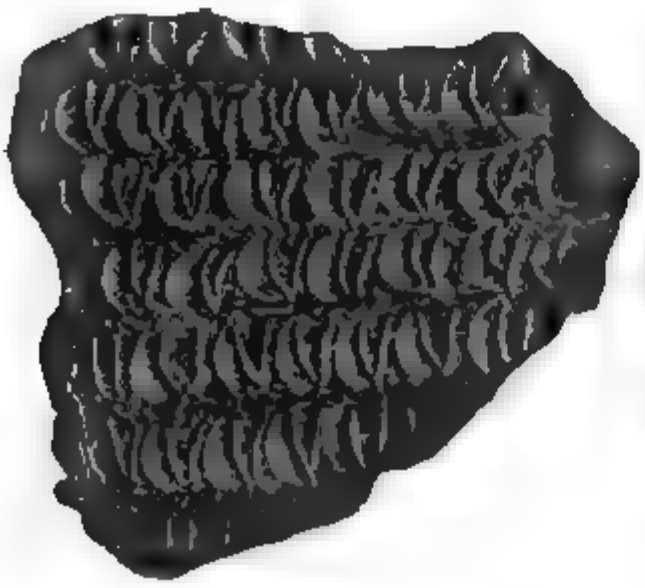
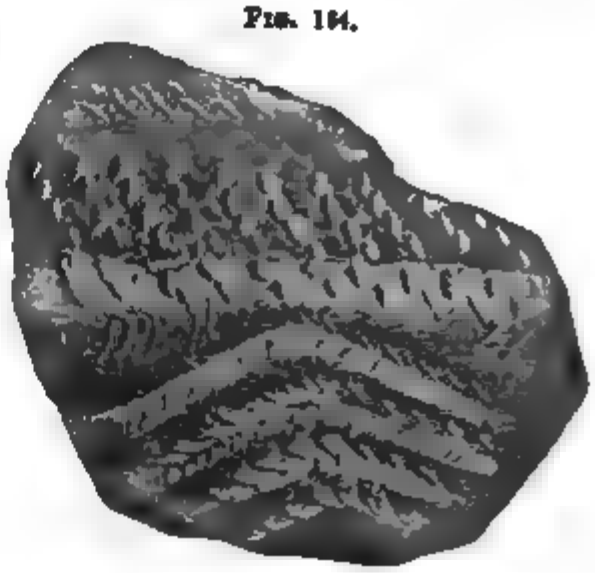


Fig. 152.

Fig. 153.

Fig. 154.



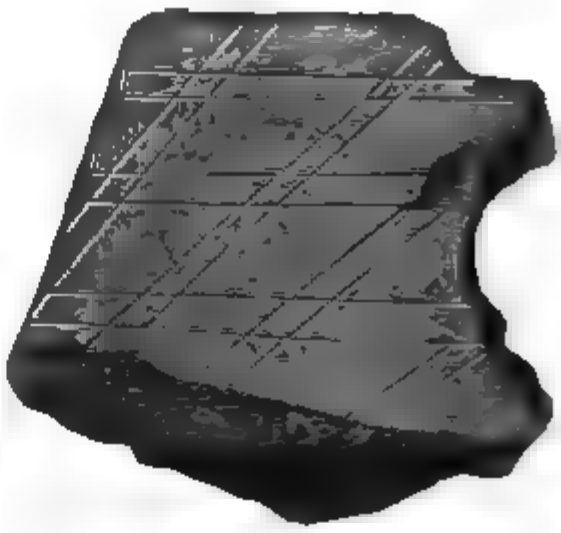
Pottery from the Tumulus at West Kennet.

the "Passage graves" generally. The chamber and entrance were nearly filled with chalk rubble, containing also bones of animals, flint implements (figs. 147–150), and fragments of pottery. In the chamber were four skeletons,

two of which appear to have been buried in a sitting posture. In different parts of the chamber were found nearly 300 flakes, three or four flint cores, a whetstone, a scraper, part of a bone pin, a bead of Kimmeridge shale, and several heaps of fragments of pottery (figs. 151–156) belonging apparently to no less than 50 different vessels, and all made by hand, with one doubtful exception. No trace of metal was discovered. The two pieces (figs. 155, 156) were found apart from the rest, and may, perhaps, be of later origin.

Fig. 155.

Fig. 156.



Pottery from the Tumulus at West Kennet.

The large tumuli of Brittany, most of which have recently been opened, have afforded several other instances of the same kind. Thus the great Mont St. Michel, at Carnac, which is no less than 380 feet in length, and 190 feet broad, with an average height of 33 feet, was found to contain a square chamber, in which were eleven beautiful jade celts, two large rough celts, and twenty-six small fibrolite celts, besides 110 stone beads and stone fragments of flint*. Again, the chamber in the tumulus called Manné-er-H'roek contained a hundred and three stone axes, three flint flakes, and fifty

* Rapport à M. Le Préfet du Morbihan sur les fouilles du Mont St. Michel. Par M. Réné Galles. 1862.

beads of jasper, quartz, and agate, but neither of these great tumuli contained a trace of metal*.

Other similar cases might be mentioned†, in which tumuli of large size, covering a sepulchral chamber, constructed with great labour, and evidently intended for a person, or persons, of high rank, have contained numerous objects of stone and pottery, without a trace of metal.

It appears reasonable to conclude that these interments belong to the ante-metallic period; especially when, as in the first-mentioned case, we find several secondary interments, plainly belonging to a later age, and although presenting no such indications of high rank, still accompanied by objects of bronze.

It may seem at first sight very improbable that works so considerable should have been undertaken and carried out by nations entirely ignorant of metal. The burial mound of Oberea, in Otaheiti, was nevertheless two hundred and sixty-seven feet long, eighty-seven wide, and forty-four in height. And in treating of modern savages, I shall hereafter have occasion to notice other instances quite as extraordinary.

The practice of burying in old tumuli, which continued even down to the times of Charlemagne‡; has led to some confusion, because objects of very different date are thus liable to be described as coming from one grave; yet, on the other hand, it is very instructive, as there are several cases on record, besides the one above mentioned, of interments characterized by bronze being found above, and being, therefore, evidently subsequent to others, accompanied by stone only §.

* Manné-er-H'roeck. Rapport à la Société Polymathique. Par M. Lefebvre et M. Réné Galles. 1863.

† See, for instance, Lukis, Archæologia, vol. xxxv. p. 247.

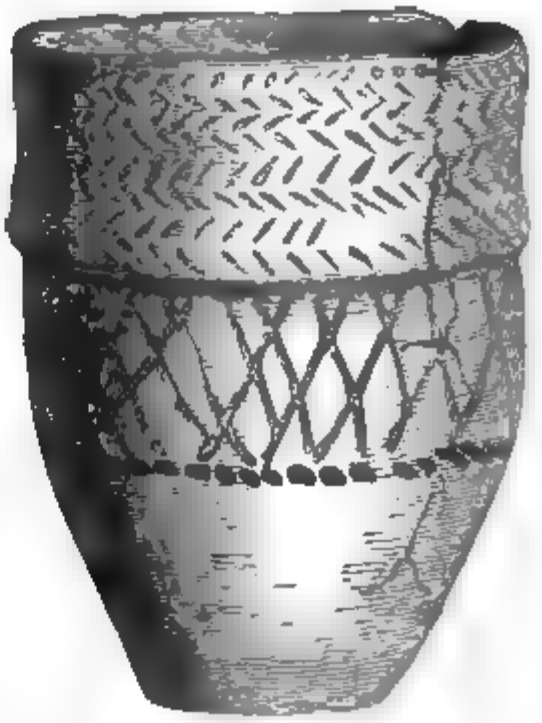
‡ One of his regulations ran as follows:—"Jubemus ut corpora Christianorum Saxonorum ad cemeteria ecclesiæ deferantur, et non ad tumulos paganorum."

§ See, for instance, Von Sacken Leitfaden zur Kunde des heidnischen Alterthumes, p. 15.

On the whole, however, though it is evident that the objects most frequently buried with the dead would be those most generally used by the living, and though the prevalence of stone implements proves the important part played by stone in ancient times, and goes far to justify the belief in a Stone Age; still, the evidence to be brought forward on this point in the following chapters will, probably, to many minds seem more satisfactory; and, at any rate, we must admit that, in the present state of our knowledge, there are comparatively few interments which we could, with confidence, refer to the Neolithic Stone Age, however firmly we may believe that a great many of them must belong to it.

Mr. Bateman has proposed to range the pottery found in ancient British tumuli under four different heads, namely, 1. Urns; 2. Incense Cups; 3. Food Vases; 4. Drinking Cups. The urns generally accompany interments by cremation, and have either contained or been inverted over burnt human bones. They are generally of large size, "from ten to sixteen inches high, with a deep border, more or less decorated by impressions of twisted thongs, and incised patterns in which the chevron or herring-bone constantly recurs in various combinations, occasionally relieved by circular punctures, or assuming a reticulated appearance. They are all made by hand, no trace of the potter's-wheel being ever found on them. They almost invariably have an overhanging rim. The material of which they are formed is clay mixed with pebbles, and some of them

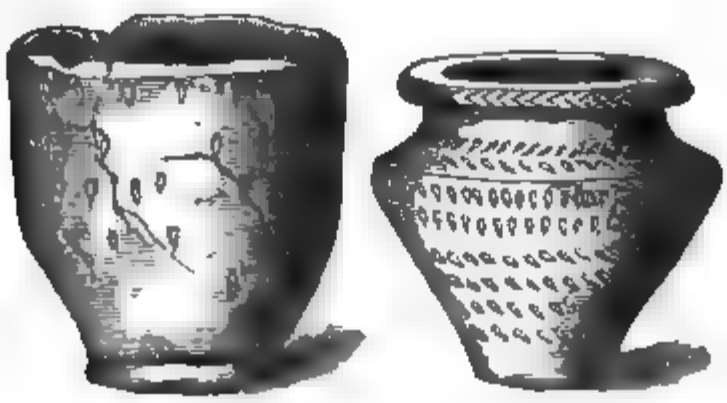
FIG. 157.



Sepulchral Urn.

have been described as "sun-dried." This, however, appears to be altogether a mistake, arising from the imperfect manner in which they were burnt. In colour they are generally brown or burnt umber outside and black inside. Fig. 157 represents a specimen from Flaxdale Barrow, in Derbyshire.

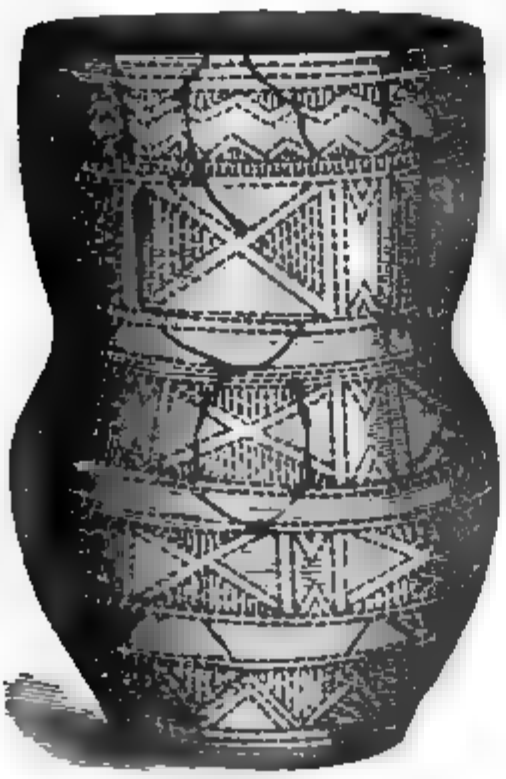
FIG. 158 FIG. 159.



Vessels from a Tumulus at Arbor Low.

Secondly, the "incense cups," so called by Sir R. Colt Hoare. They differ very much in shape, and are seldom more than three inches high. When decorated, the patterns are the same as those on the urns, and are usually on the under surface, but they are often left plain. They are often pierced, and it is possible that some of them were used for lamps, as was, I believe, first suggested by Mr. Birch. "The third division includes vessels of every style of ornament, from the rudest to the most elaborate, but nearly alike in size, and more difficult to assign to a determinate period than any other, from the fact of a coarse and a well-finished one having several times been found in company." The above woodcuts

FIG. 160.



Drinking Cup.

(figs. 158, 159) represent two vessels found in a barrow on the circle at Arbor Low, in Derbyshire.

Fourthly, "The drinking-cups (fig. 160) are generally from six and a half to nine inches high, of a tall shape, contracted in the middle, globular below, and expanding at the mouth: they are carefully formed by hand, of fine clay, tempered with sharp sand, and well-baked; the walls are thin, averaging about three-eighths of an inch, light brown outside and grey within." They are generally much ornamented, and usually accompany well-made flint implements; but in some cases bronze awls have been found with them. Mr. Bateman considers that the greater number belong to the ante-metallic period.

Numerous as are the varieties of pottery found in ante-Roman tumuli, they appear (so far, at any rate, as those discovered by Mr. Bateman are concerned) to have been all made by hand, without any assistance from the potter's wheel; they are formed of clay tempered with sand, and often with pebbles; they very rarely have handles, and spouts seem to have been unknown; the ornaments consist of straight lines, dots, or marks, as if a cord had been impressed on the soft clay; circular or curved lines are rare, nor is there the slightest attempt to copy any animal or plant.

As a general rule the megalithic monuments are constructed of rough stones neither hewn nor ornamented. Lately, however, many instances of engravings have been observed. In the north of England and in Scotland these generally take the form of cups, spirals, circles with a dot in the middle, or incomplete circles with a dot in the middle, or incomplete circles with a line running from the centre through the interval, as in fig. 161*. We have as yet no satisfactory

* See Tate on the sculptured rocks of Northumberland, 1865. Sir J. Y. Simpson, on Ancient Sculpturings of Cups and Concentric Rings, etc. Proc. S. of Antiquaries of Scotland, vol. vi. 1867. The monuments described by

clue to the meaning of these engravings, many of which have been figured by Mr. Tate and Sir J. Y. Simpson. They occur in evident association with ancient oppida and fortifications, as well as on menhirs, and on the stones composing dolmens and cromlechs. Fig. 161 represents a characteristic group on the rocks of Auchnabreach in Argyllshire. The surface of the rock is well adapted to receive such sculpturings, having been smoothed and prepared by glacial action.

Fig. 161.

Rock Sculptures.—Scotland.

Similar sculpturings have been found in Ireland, where also the great tumuli on the Boyne afford instances of more elaborate ornamentation. The great stone at the entrance of New Grange, for instance, is covered with double spirals,

Mr. Stuart, in his great work on the Sculptured Stones of Scotland, belong to a much later period, and scarcely fall within the scope of the present work. For rock carvings in Spain see Don M. de Góngora y Martinez. Antigüedades Prehistóricas de Andalucia.

and those forming the central chamber are also covered with circles, spirals, and other patterns, one of the most remarkable being that of a so-called fern leaf, which occurs also in Brittany and in the so-called temple of Hagar Kem, in Malta.

Mr. Conwell has recently discovered an extensive series of interesting sepulchral sculptures in the county of Meath.

With the exception of the "fern leaf," all these archaic sculpturings in Great Britain are mere geometrical figures. The same figures also occur in Brittany, accompanied, however, by frequent representations of stone axes, both with and without handles.

The rock sculptures of Scandinavia present a still further advance, many of them being rude representations of boats, much like those on some of the bronze knives (figs. 42–45).

The most remarkable monument of this kind, however, is that of Kivik in Scania, close to the shore of the Baltic.

The remains of other mammals found with ancient human relics have acquired increased interest, since the admirable researches of the Danish and Swiss zoologico-archæologists, and especially of Steenstrup and Rütimeyer, by whose skilful cross-examination much valuable and unexpected evidence has been elicited, from materials of most unpromising appearance. Unfortunately the non-human remains found in tumuli are usually in a very fragmentary condition, and have received little attention from archæologists. No remains of any extinct animal have ever been found in the tumuli of Western Europe. Even the reindeer is altogether absent. The deer and ox are most frequent. The latter was certainly domesticated in Switzerland as early as the Neolithic period. Whether this was the case in Northern Europe is still uncertain. Some archæologists believe the dog to have been at that period the only animal domesticated; others, on the contrary, consider the cow, sheep, pig, and goat, if not the horse, to have been at that early period domesticated in the North.

In the contents of British barrows, bones of these animals have been frequently observed; but it is not as yet determined whether they belong to wild or tame individuals.

As far, however, as the horse is concerned, we may probably assume that all the remains belong to a domesticated race, for there is no reason to suppose that any wild horses existed in Great Britain at a period so recent. I have thought, therefore, that it might be of interest to point out the class of graves in which bones or teeth of horses were found. In Mr. Bateman's valuable works there are, altogether, twenty-eight cases; but of these, nine were in tumuli which had been previously opened, and in one case no body was found. Of the remaining eighteen, five were tumuli containing iron, and seven were accompanied with bronze. In one more case, that of the "Liffs," it is doubtful whether the barrow had not been disturbed. Of the remaining six tumuli, two contained beautiful drinking vessels, of a very well marked type, certainly in use during the Bronze Age, if not peculiar to it; and in both these instances, as well as in a third, the interment was accompanied by burnt human bones, suggestive of dreadful rites. Even, however, if these cases cannot be referred to the Bronze Age, we still see that out of the two hundred and ninety-seven interments only sixty-three contained metal, or about twenty-one per cent., while out of the eighteen cases of horses' remains twelve, or about sixty-six per cent., certainly belong to the metallic period. This seems to be *primâ facie* evidence that the horse was very rare, if not altogether unknown in England during the Stone Age. Both the horse and bull appear to have been sacrificed at graves during later times, and probably formed part of the funeral feast. The teeth of oxen are so common in tumuli, that they are even said by Mr. Bateman to be "uniformly found with the more ancient interments."

The very frequent presence of the bones of quadrupeds in

tumuli appears to show that sepulchral feasts were generally held in honour of the dead, and the numerous cases in which interments were accompanied by burnt human bones tend to prove the prevalence of still more dreadful customs, and that not only horses* and dogs, but slaves also, were frequently sacrificed at their masters' graves; it is not improbable that wives often were burnt with their husbands, as in India, and among many savage tribes. For instance, among the Feegees it is usual on the death of a chief to sacrifice a certain number of slaves, whose bodies "are called 'grass' for bedding" the grave†. "It is probable," says Mr. Bateman, "that the critical examination of all deposits of burnt bones would lead to much curious information respecting the statistics of suttee and infanticide, both which abominations we are unwillingly compelled, by accumulated evidence, to believe were practised in pagan Britain." From the numerous cases in which the bones of an infant and a woman have been found together in one grave, it seems probable that if any woman died in childbirth, or while nursing, the baby was buried alive with her, as is still the practice among some of the Esquimaux families.

I would practically urge on those who may in future open any barrows—

1. To record the sex of the person buried; this is more satisfactorily to be determined from the form of the pelvis, than from the skull. In this manner we may hope to determine the relative position, and the separate occupations (if any) of the two sexes.

2. To observe the state of the teeth, from which we may derive information as to the nature of the food.

3. To preserve carefully any bones of quadrupeds that

* Even so lately as in 1781, Frederick Casimir was laid in his grave with his slaughtered horse. Horæ ferales, p. 66.

† Manners and Customs of the Feegees, by T. Williams, 1860, vol. i. p. 189.

may be present, in order to ascertain the species, and, in the case of the ox and hog, to determine, if possible, whether they belong to wild or domesticated individuals.

We may fairly hope that when thoroughly questioned they will not only answer many of these interesting questions, but that they will also tell us many things which it would never occur to us to ask. It is evident, at least, that when a sufficient number shall have been examined we shall know much more than we do yet, about the social and domestic life of those early ages; we shall know whether during the Stone Age they had domestic animals in the North as would appear to have been the case in Switzerland; we shall know in part what kind of clothes they wore, and by the remains found with female skeletons we shall even be able to ascertain, in some measure, the position occupied by woman with reference to man.

If, however, we are to acquire all the information that can be derived from the burial mounds, it must be done quickly. Every year many are destroyed, and Abury itself, the grandest of megalithic monuments, was sacrificed for a paltry profit of a few pounds.

Moreover, as population increases, and land grows more valuable, these ancient monuments become more and more liable to mutilation and destruction. We cannot afford them the protection of our museums, but it is very desirable that Government should select some competent archæologist to act as conservator of the national antiquities, whose duty it would be, as far as possible, to preserve from wanton injury the graves of our ancestors and other interesting monuments of the past; to make careful drawings of all those which have not yet been figured, and to report from time to time upon their condition. At a very trifling expense the Danish government have bought for the nation a large number of tumuli, and have thus preserved many national monuments which would otherwise have been destroyed.

CHAPTER VI.

THE ANCIENT LAKE-HABITATIONS OF SWITZERLAND.

IN consequence of the extraordinary dryness and cold of the weather during the winter months of 1853, the rivers of Switzerland did not receive their usual supplies, and the water in the lakes fell much below its ordinary level, so that, in some places, a broad strand was left uncovered along the margin, while in others shallow banks were converted into islands. The water level of this season was, indeed, the lowest upon record. The lowest level marked on the so-called stone of Stäfa was that of 1674; but in 1854 the water sank a foot lower still.

In a small bay between Ober Meilen and Dollikon, on the Lake of Zurich, the inhabitants had taken advantage of the lowness of the water to increase their gardens, by building a wall along the new water-line, and slightly raising the level of the piece thus reclaimed, by mud dredged from the lake. In the course of this dredging they found great numbers of piles, of deer-horns, and also some implements. M. Aeppli of Meilen, on the Lake of Zurich, was the first to observe these specimens of human workmanship, which he justly supposed might throw some light on the history and condition of the early inhabitants of the Swiss valleys. He at once, therefore, called the attention of Dr. Keller to them, and that eminent antiquary soon satisfied himself as to their true nature, and proved that the early inhabitants of Switzer-

land constructed some, at least, of their dwellings above the surface of the water, and that they must have lived in a manner very similar to that of the Pæonians, as described by Herodotus*.

"Their dwellings," he says, "are contrived after this manner: planks fitted on lofty piles are placed in the middle of the lake, with a narrow entrance from the main land by a single bridge. These piles, that support the planks, all the citizens anciently placed there at the public charge; but afterwards they established a law to the following effect: whenever a man marries, for each wife he sinks three piles, bringing wood from a mountain called Orbelus: but every man has several wives. They live in the following manner: every man has a hut on the planks, in which he dwells, with a trap-door closely fitted in the planks, and leading down to the lake. They tie the young children with a cord round the foot, fearing lest they should fall into the lake beneath. To their horses and beasts of burden they give fish for fodder; of which there is such an abundance, that when a man has opened his trap-door, he lets down an empty basket by a cord into the lake, and, after waiting a short time, draws it up full of fish."

At the Newcastle meeting of the British Association, in 1863, Lord Lovaine described a Lake-dwelling observed by him in the South of Scotland; and in the "Natural History Review," for July, 1863, I had already mentioned one in the North, which, however, had not at that time been thoroughly examined. Sir Charles Bunbury has recorded (Quarterly Journal of the Geological Society, vol. xii. 1856) some similar remains found near Thetford, which have been described at greater length by Mr. Alfred Newton, in an interesting paper "On the Zoology of Ancient Europe," read before the Cambridge Philosophical Society, in March, 1862. In his

* Terpsichore, v. 14.

fifth memoir on the Pfahlbauten*, Dr. Keller has described a Lake-dwelling at Peschiera, on the L. di Garda; and we are indebted to MM. B. Gastaldi†, P. Strobel, and L. Pigorini for a description of ruins of a similar nature, which have been found in Northern Italy. Dr. Lisch has described several Pile-dwellings in Mecklenburg, and M. Boucher de Perthes, in his celebrated work, "Antiquités Celtiques et Antédiluviennes," mentions certain remains found in the peat near Abbeville, which appear to have been the ruins of Lake-dwellings; an observation which is of special interest, as an additional argument for referring the Swiss Lake-dwellings to the period of the peat in the Somme valley, and therefore to an epoch long subsequent to that of the drift-hatchets. This inference is entirely in accordance with the conclusions derived from the study of the stone implements themselves.

But it is not necessary to go back to pre-historic times; nor need we appeal to doubtful history or ancient remains for evidence of the curious habit of water-dwelling. Many savage or semi-savage tribes live in the same manner, even at the present day. I have been informed by a friend who lives at Salonica that the fishermen of Lake Prasias still inhabit wooden cottages built over the water, as in the time of Herodotus. The city of Tcherkask also is built over the Don. In parts of Sinde the pastoral tribes "dwell in habitations elevated eight or ten feet from the ground, to avoid the damp and the insects occasioned by it‡." Similar dwellings are extensively used in the northern parts of South America; Venezuela, indeed, having been so called because the houses resemble those of Venice in being constructed

* Mittheilungen der Antiquarischen Gesellschaft in Zurich, 1863.

† Nuovi Cenni sugli oggetti di Alta Antichità trovati nelle Torbiere e nelle Marniere dell' Italia. See also Stoppani, Prima ricerca di Abitazioni lacustri nei Laghi di Lombardia. Atti della Soc. Italiani di Scienze Naturali, 1863, vol. v. p. 154.

‡ Burnes. Travels into Bokhara, vol. iii. p. 90.

over water. But it is in the East Indies that this habit prevails most extensively. The city of Borneo is altogether built upon piles, and similar constructions have been described by various travellers in New Guinea, Celebes, Solo, Ceram, Mindanao, the Caroline Islands, and elsewhere. Dampier long ago mentioned similar dwellings constructed over the water, and Dumont d'Urville*, quoted by M. Troyon, tells us that "Jadis toute la ville de Tondano était construite sur le lac, et l'on ne communiquait d'une maison à une autre qu'en bateau. Forts de cette disposition, en 1810, les habitants eurent de démêlés avec les Hollandais, et voulurent secouer leur joug: ils s'armèrent et furent battus. Ce ne fut pas sans peine qu'on en vint à bout: il fallut y porter de l'artillerie et construire des bateaux canoniers. Depuis ce temps, et pour éviter cet inconvénient, on a défendu aux indigènes de construire leurs habitations sur le lac." The Bishop of Labuan thus describes the dwellings of the Dyaks: "They are built along the river side, on an elevated platform twenty or thirty feet high, in a long row; or rather it is a whole village in one row of some hundreds of feet long. The platforms are first framed with beams, and then crossed with laths about two inches wide and two inches apart, and in this way are well ventilated; and nothing remains on the floors, but all the refuse falls through and goes below†."

In Ireland a number of more or less artificial islands called "Crannoges‡" (fig. 162) are known historically to have been used as strongholds by the petty chiefs. They are composed of earth and stones, strengthened by piles, and have supplied the Irish archæologists with numerous weapons, implements, and bones. From the Crannoge at Dunshauglin, indeed,

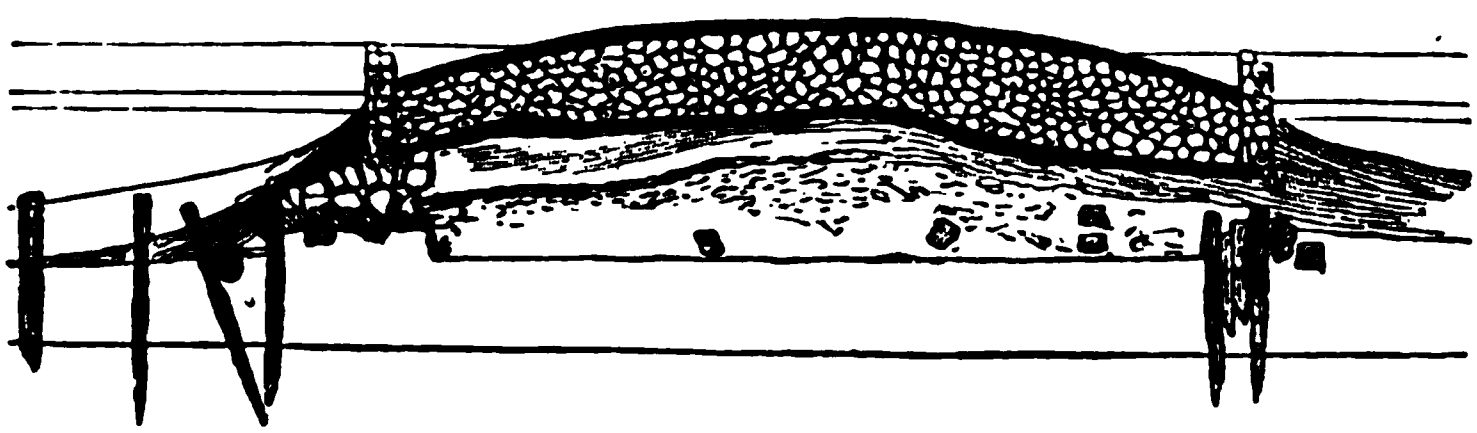
* Voyage de l'Astrolabe, vol. v. p. 635.

† Trans. of the Ethnol. Soc. New Series, vol. ii. p. 28.

‡ See Wilde's Catalogue, vol. i. p. 220.

more than one hundred and fifty cart-loads of bones were obtained and used as manure! These Lake-dwellings of Ireland, however, are referable to a much later period than those of Switzerland, and are frequently mentioned in early history. Thus, according to Shirley, "One Thomas Phettiplace, in his answer to an inquiry from the Government, as to what castles or forts O'Neil hath, and of what strength they be, states (May 15, 1567): 'For castles, I think it be not unknown unto your honors, he trusteth no point thereunto for his safety, as appeareth by the raising of the strongest castles of all his countreys, and that fortification which he only dependeth upon is *in sartin ffreshwater loghes* in his

Fig. 162.



Section of a Crannoge in Ardakillin Lough, Roscommon.

country, which from the sea there come neither ship nor boat to approach them: it is thought that there in the said fortified islands lyeth all his plate, which is much, and money, prisoners, and gages: which islands hath in wars to fore been attempted, and now of late again by the Lord Deputy there, Sir Harry Sydney, which for want of means for safe conducts upon the water it hath not prevailed.'"

Again, the map of the escheated territories, made for the Government, A.D. 1591, by Francis Jobson, or the "Platt of the County of Monaghan," contains rough sketches of the dwellings of the petty chiefs of Monaghan, which "are in all cases surrounded by water." In the "Annals of the Four Masters," and other records of early Irish History, we meet with numerous instances in which the Crannoges are men-

tioned, in some of which their position has not preserved them from robbery and destruction; and we need not, therefore, be surprised to find that many of the Swiss Pfahlbauten appear to have been destroyed by fire.

The Swiss "*Pfahlbauten,*" or Lake-habitations, have been described by Dr. Keller, in six memoirs presented to the Antiquarian Society of Zurich, in 1854, 1858, 1860, 1863, and 1866, and subsequently translated into English by Mr. Lee. M. Troyon, also, in a special work, "Sur les Habitations Lacustres," 1860, has given a general account of the ancient habitations of his native land, accompanied with the Lake-dwellings of other countries and times. The discoveries in Lake Moosseedorf have been described by MM. Jahn and Uhlmann (Die Pfahlbaualterthümer von Moosseedorf. Bern, 1857); Mr. Desor has published a memoir entitled Les Palafittes ou constructions lacustres du lac de Neuchatel; the Lake-habitation at the Pont de Thiéle has also been described in a separate memoir by M. V. Gilliéron (Actes de la Société jurassienne d'Emulation, 1860); and we owe to Dr. Rütimeyer two works on the animal remains from the Pfahlbauten, the first, "Untersuchung der Thierreste aus den Pfahlbauten der Schweiz," published by the Antiquarian Society of Zurich, in 1860; and still more recently, a larger work—"Die Fauna der Pfahlbauten in der Schweiz." Collections of objects from these localities have also been made by many Swiss archæologists. The Flora has been studied by M. Heer, whose results are contained in the memoirs published by Dr. Keller, and in a special paper "Die Pflanzen der Pfahlbauten."

Nor must we omit to mention M. Morlot's excellent paper in the "Bulletin de la Société Vaudoise (March, 1860)," and his no less admirable "Leçon d'Ouverture d'un cours sur la haute Antiquité fait à l'Académie de Lausanne (Dec. 1860)." The Swiss archæologists have indeed made the most of a golden opportunity. Not only in the lake of Zurich, but

also in Lakes Constance, Geneva, Neufchatel, Bienne, Morat, Sempach, in fact in most of the large Swiss lakes, as well as in several of the smaller ones (Inkwyl, Pfeffikon, Moosseedorf, Luissel, etc.), similar Lake-habitations have been discovered. In the larger lakes, indeed, not one, but many of these settlements existed; thus, there are already on record, in Lake Bienne, twenty; in the Lake of Geneva, twenty-four; in Lake Constance, thirty-two; in Lake Neufchatel, as many as forty-nine; on the whole more than two hundred; and many others, doubtless, remain to be discovered. Of those already known, some belong to the Iron Age, some few even to Roman times; but the greater number appear to be divided in almost equal proportions between the age of Stone and that of Bronze.

Though the architecture of this period was probably simple, still the weight to be sustained on the wooden platforms must have been considerable; and many of the piles are either bent or broken; and to prevent them sinking too deeply into the soft mud they were sometimes driven through boards which rested on the bottom.

The dwellings of the Gauls are described as having been circular huts, built of wood and lined with mud. The interstices appear to have been filled with moss. Some of the huts on the Pileworks were probably of a similar nature. This supposition is not a mere hypothesis, but many fragments of the clay used for the lining have been discovered. Their preservation is evidently due to the building having been destroyed by fire, which has hardened the clay, and enabled it to resist the action of the water. These fragments bear, on one side, the marks of interlaced branches, while on the other, which apparently formed the inner wall of the cabin, they are quite smooth. Some of those which have been found at Wangen are so large and so regular, that M. Troyon felt justified in concluding that the cabins were circular, and from ten to fifteen feet in diameter. It would be most interesting

if we could construct a retrospective census for these early periods, and M. Troyon has made an attempt to do so. The settlement at Morges, which is one of the largest in the Lake of Geneva, is 1,200 feet long and 150 broad, giving a surface of 180,000 square feet. Allowing the huts to have been fifteen feet in diameter, and supposing that they occupied half the surface, leaving the rest for gangways, he estimates the number of cabins at 311; and supposing again that, on an average, each was inhabited by four persons, he obtains for the whole a population of 1244. Starting from the same data, he assumes for the Lake of Neufchatel a population of about 5000. Sixty-eight villages belonging to the Bronze Age are supposed to have contained 42,500 persons; while for the preceding epoch, by the same process of reasoning, he estimates the population at 31,875.

So far as these calculations rest on the fragments of the clay walls, they must be regarded as altogether unsatisfactory, since Dr. Keller informs me that the largest pieces yet discovered are only a foot in their greatest diameter. There is also good reason to believe that the huts were generally not circular, but rectangular. Nor am I inclined to attribute much value to the estimates of population based on the extent of the platforms. M. Troyon himself admits that his "chiffres sont peut-être un peu élevés, eu égard aux habitations sur terre ferme, dont il ne peut être question dans ce calcul, et vu qu'on est encore bien loin de connaître tous les points des lacs qui ont été occupés," and, indeed, in the three years which have elapsed since his book was written, the number of Lake villages discovered has been doubled. Moreover, M. Troyon assumes that the Lake villages of the Bronze Age were contemporaneous, and that the same was the case with those belonging to the Stone Age. This also I should be disposed to question; both these periods, but especially the Stone Age, in all probability extended over a

long series of years, and though in these matters it is of course necessary to speak with much caution, still if we are to make any assumption in the case, it would seem safer to suppose that in each period some of the villages had perished, or been forsaken, before others were built.

We might feel surprised that a people so uncivilized should have constructed their houses with immense labour on the water, when it would have been so much more easy to have built them on dry land. But we have already seen how, even in historical times, such dwellings have served as simple and yet valuable fortifications. Still, though it is evident that the security thus given would amply compensate for much extra labour, it remains difficult to understand in what manner the piles were driven into the ground.

In many cases, indeed, settlements of the Stone Age are characterized by what are called "steinbergs," that is to say, artificial heaps of stones, etc., evidently brought by the natives to serve as a support to the piles. A boat laden with stones, apparently for this purpose, was some years ago discovered in the Lake of Neufchatel. In fact, they found it easier to raise the bottom round the piles, than to drive the piles into the bottom. On the other hand, some of these constructions, as, for instance, those at Inkwyl and Wauwyl, described respectively by M. Morlot and Col. Suter, more closely resemble the Irish Crannoge. We see, therefore, that, as Dr. Keller says, the Lake-dwellers followed two different systems in the construction of their dwellings, which he distinguishes as "Pfahlbauten," or Pilebuildings, and "Packwerkbauten," or Crannoges: in the first of which the platforms were simply supported on piles; in the second of which the support consisted not of piles only, but of a solid mass of mud, stones, etc., with layers of horizontal and perpendicular stakes, the latter serving less as a support than to bind the mass firmly together. It is evident that the "Packwerkbau" is a much simpler and ruder affair than

the "Pfahlbau," in which no small skill must have been required to connect the perpendicular and horizontal piles firmly together. Still the "Packwerkbauten" were not suitable for the larger lakes, as during storms they would have been injured by the waves, which must have passed harmlessly through the open work of the "Pfahlbauten." We find, therefore, that while the former method of construction prevailed only in small lakes or morasses, the latter was adopted in the larger lakes, and even sometimes, possibly, *on dry land;* a custom which, however singular, exists at the present day, as, for instance, in the island of Borneo, and even in Switzerland itself.

The antiquities found at Wauwyl, Robenhausen, at the Pont de Thiéle, at Moosseedorf, and elsewhere in small lakes and peat-bogs, are more or less covered by a thick layer of peat, which perhaps at some future date will give us a clue to their age. On the contrary, in the large lakes no peat grows. At the entrance of the rivers, indeed, much mud and gravel is of course accumulated; the Lake of Geneva, for instance, once no doubt extended for a considerable distance up the Valley of the Rhone. But the gravel and mud brought down by that river are deposited, as every one knows, near its entrance into the lake, and the water of the lake is elsewhere beautifully clear and pure.

The lake itself is very deep, in parts as much as nine hundred and eighty feet; and the banks are generally steep, but round the margin there is, in most places, a fringe of shallow water, due, probably, to the erosive action of the waves, and known to the fishermen as the "blancfond," because the lake is there of a pale greyish hue, when contrasted with the bright blue of the central deeper water. It is on this "blancfond," and at a depth of sometimes as much as fifteen feet, that the Pfahlbauten were generally constructed. On calm days, when the surface of the water

is unruffled, the piles are plainly visible. Few of them now project more than two feet from the bottom; eaten away by the incessant action of the water, some of them "n'apparaissent plus que comme aiguilles," which finally also disappear, and leave only a black disk at the surface of the mud. This, however, is the case principally in the Lake villages of the Stone Age. "Ce qui les distingue surtout," says Prof. Desor, "c'est la qualité des pieux, qui sont beaucoup plus gros que ceux des stations du bronze: ce sont des troncs entiers, mesurant jusqu'à 28 et 30 centimètres. Au lieu de faire saillie dans l'eau, ils sont à fleur du fond." On the other hand, in speaking of the Bronze Age piles, he says: "Les pieux sont plus grêles; ce sont fréquemment des troncs fendus en quatre, n'excédant guère 4, au plus 5 pouces de diamètre; au lieu d'être à fleur du fond, ils s'élèvent de 1 à 2 pieds au-dessus de la vase, ce qui permet de les reconnaître facilement, malgré leur plus grand profondeur." M. Troyon also tells us that "On peut dire que les pilotis de la fin du deuxième âge, anciens de plus de deux mille ans et saillants d'un à trois pieds au-dessus de la vase, présentent à peu près partout le même aspect, tandis que ceux de l'âge de la pierre ont été généralement usés jusqu'à la surface du limon dont ils sont parfois recouverts*."

The more complete destruction of the piles belonging to the earlier period depends not only on their greater age, but on their occurrence in shallower water. The action of the waves being greatest near the surface, and diminishing gradually downwards, not only are those piles which occupy the deeper parts least liable to destruction, but in each the erosion takes place gradually from above, so that the upper end of the piles is often more regularly pointed even than the lower. Lying among them are fragments of bone, horn, pottery, and sometimes objects of bronze. Most of these are em-

* Les Constructions lacustres du lac de Neufchatel.

bedded in the mud or hidden under the stones, but others lie on the bottom yet uninjured; so that when for the first time I saw them through the transparent water, a momentary feeling of doubt as to their age rose in my mind. So fresh are they and so unaltered, they look as if they were only things of yesterday, and it seems hard to believe that they can have remained there for centuries. The explanation of the difficulty is, however, to be found in the fact that the action of the most violent storms is perceptible only to a small depth. Except, therefore, near the mouths of rivers, or where there is much vegetation, which in the large lakes is rarely the case, the deposition of mud at depths greater than four feet is an extremely slow process, and objects which fall to the bottom in such situations will neither be covered over nor carried away. "J'ai pêché," says M. Troyon, "sur l'emplacement en face du Moulin de Bevaix, les fragments d'un grand vase qui gisaient à peu de distance les uns des autres, et que j'ai pu réunir de manière à les remontre complétement. A la Tongue, près d'Hermance, j'ai trouvé les deux fragments d'un anneau support, distants de quelques pieds, qui, en les rapprochant ne laissent aucun interstice." The upper parts of the objects also, which are bathed by the water, are generally covered by a layer of carbonate of lime, while the lower part which has sunk into the mud is quite unaltered. M. Troyon once obtained at Cortaillod a pair of bracelets in one haul of the dredge—the first, which had been visible from the boat, was greenish and covered with incrustation; the second, which had been in the mud immediately below, was as fresh as if it had only just been made.

As piles of the Bronze Age are sometimes found at a depth of as much as fifteen feet, and it is manifest that buildings cannot have been constructed over water much deeper than this, it is evident that the Swiss lakes cannot then

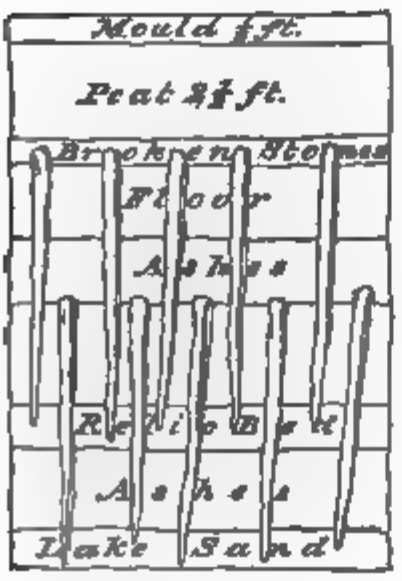
have stood at a much higher level than at present. This conclusion is confirmed by the position of Roman remains at Thonon, on the lake of Geneva, and we thus obtain satisfactory evidence that the height of the Swiss lakes must have remained almost unaltered for a very long period.

In the large lakes the passing traveller may readily mark the number and general distribution of the piles, he may determine the area which they occupy, and pick up fragments of bone and pottery; but, on the whole, the peat-mosses are more instructive. In them we not only obtain evidence as to the size, form, and construction of the huts, but implements of wood, specimens of fruit, nuts, grain, and even fragments of clothing, none of which can be preserved in the open water of the large lakes.

After having chosen a favourable situation, the first step in the construction of the Lake-habitations was to obtain the necessary timber. To cut down a tree with a stone hatchet must have been no slight undertaking. It is, indeed, most probable that use was made of fire, in the same manner as is done by existing savages in felling trees and making canoes. Burning the wood and then scraping away the charred portion renders the task far more easy, and the men of the Stone period appear to have avoided the use of large trees, except in making their canoes. Their piles were embedded in the mud from one to five feet, and must also have projected from four to six feet above the water level, which cannot have been very different from what it is at present. They must, therefore, have had a length of from fifteen to thirty feet, and they were from three to nine inches in diameter. The pointed extremity which entered into the mud still bears the marks of the fire and the rude cuts made by the stone hatchets. The piles belonging to the Bronze period, being prepared with metal axes, were much more regularly pointed, and the differences between the two have

been ingeniously compared to those shown by lead pencils well and badly cut. Moreover, a cut by a stone axe is necessarily more or less concave, whereas those made with metal are flat. To drag the piles to the lake, and fix them firmly, must also have required much labour, especially when their number is considered. At Wangen alone M. Löhle has calculated that 50,000 piles were used; but we must remember that these were probably not all planted at one time, nor by one generation. Wangen, indeed, was certainly not built in a day, but was, no doubt, gradually enlarged as the population increased. Herodotus informs us that the Paeonians made the first platform at the public expense, but that, subsequently, at every marriage (and polygamy was permitted), the bridegroom was expected to add a certain number of piles to the common support. Fig. 163 represents a section taken at Niederwyl, and shows two series of piles, one over the other. The layer of ashes appears to indicate that the settlement was burnt down, and subsequently rebuilt. The pile-works of subsequent periods differ little from those of the Stone Age, so far at least as can be judged by the parts remaining, but the piles are less decayed, and project above the mud farther than is the case with those of the preceding epoch.

Fig. 163.



Section at Niederwyl.

Through the kindness of Col. Suter I had an opportunity of examining the construction of the Lake-dwelling at Wauwyl, near Zofingen, in the Canton of Lucerne. This apparently belonged to the Stone Age, no trace of metal having yet been discovered in it. It is situated in a peat moss, which was evidently at one time the bed of a shallow

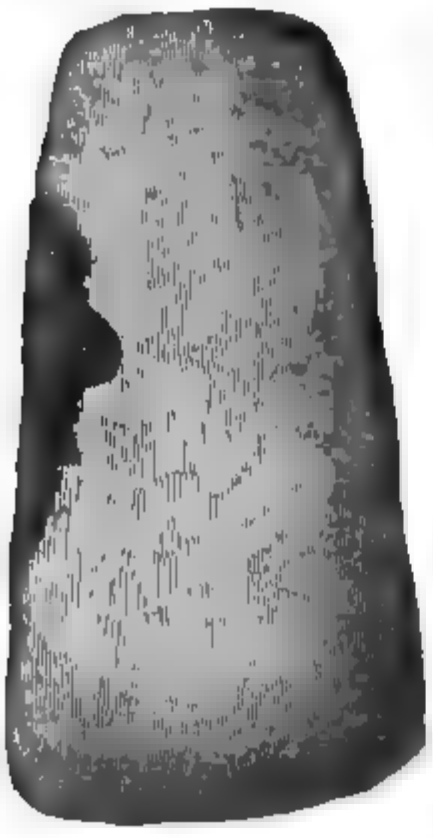
lake. By the gradual growth of peat, however, the level has been raised several feet, and the plain has recently been drained. We were assisted by six labourers, who dug out the peat, which we then carefully examined. I mention this, because the difference in the objects collected from different Pfahlbauten may probably be, in part at least, accounted for by the different ways in which the search has been made. The peat at Wauwyl varies in thickness from three to ten feet, and rests on a white bed consisting of broken fresh-water shells. This stratum, though only a few inches thick, is found in the old beds of many small lakes, and is frequently mentioned by the Swiss archæologists under the name of "weissgrund." It must not, however, be confounded with the "blancfond" of the larger lakes. The piles go through the peat and the "weissgrund" into the solid ground below. It is not easy to obtain them whole, because the lower portions are much altered by time, and so thoroughly saturated by water, that they are quite soft. Col. Suter, however, extracted two of them; one was 14ft. 6in. in length, of which 4ft. was in the peat, and the remaining 10ft. 6in. in the sand beneath; the other was only 8ft. 6in. long, 4ft. of which was in the peat, the other 4ft. 6in. in the solid ground. The piles vary from three to five inches in diameter, and are always round, never having been squared. The lower part is very badly cut, so that it is difficult to understand how they can have been forced to so great a depth into the ground.

In most of the Pfahlbauten the piles are scattered, more or less irregularly, over the whole extent of the settlement; at Wauwyl this is not the case, but they enclose, as it were, four quadrangular areas, the interiors of which are occupied by several platforms one over the other, the interstices being filled up by branches, leaves, and peat. The objects of antiquity are not scattered throughout the peat, but lie either on the layer of broken shells, which formed the then

bottom of the lake, or in the lower part of the peat. It is, therefore, evident that almost the whole, if not the whole, of the peat has grown since the time at which this interesting ruin was inhabited. The upper part had, however, been removed before our arrival, so that the "culturgeschicht," the layer containing the objects of antiquity, was exposed ready for examination in the manner already described.

Some of the piles still stand two or three feet above the level of the peat, but the greater number are broken off lower down. We stood on one of the upper platforms, which seems to have been the floor on which the huts were erected, and the beams of which are still perfectly preserved. It was at first a question in what manner the platforms at this place were supported; whether they rested like a raft on the surface of the water, rising and sinking with it*; or whether they were fixed, and rested on a sort of artificial island, formed by the clay, branches, etc., which now occupy the interspaces between the different platforms. Subsequent observations, however, confirmed as they have been by discoveries elsewhere, as, for instance, at Inkwyl and Niederwyl, have decided the question in favour of the latter hypothesis.

FIG. 164.



Swiss Stone Axe.

During my visit at Wauwyl we obtained four small stone axes, one arrow-head, four flint flakes, fifteen rude stone ham-

* Dwellings of this character occur in the East and in S. America. See, for instance, Anderson's Mission to Sumatra, p. 395. Squier, American Naturalist, vol. iv. p. 18.

mers, eight whetstones, thirty-three slingstones, eight instruments of bone, and two of wood, besides numerous bones, and a great quantity of broken pottery. Col. Suter regarded this as a fair average day's work. Altogether about 500 instruments of stone and bone have been discovered at Wauwyl; at Moosseedorf more than 3300; at Wangen no less than 5800, while M. Troyon estimates that those at Concise must have amounted to 25,000.

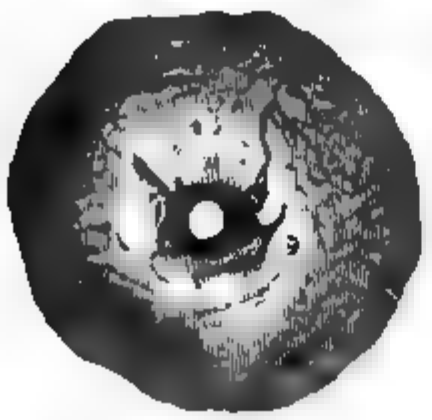
The axe was pre-eminently *the* implement of antiquity. It was used in war and in the chase, as well as for domestic purposes, and great numbers have been found, especially at Wangen (Lake of Constance) and Concise (Lake of Neufchatel). With a few exceptions, they were small, especially when compared with the magnificent specimens from Denmark; in length they varied from one to six inches, while the cutting edge had generally a width of from fifteen to twenty lines. Flint was sometimes used, and nephrite or jade, in a few cases, but serpentine and diorite were the principal materials. Most of the larger settlements were evidently manufacturing places, and many spoilt pieces and half-finished specimens have been found. After having chosen a stone, the first step was to reduce it by blows with a hammer to a suitable size. Then grooves were made artificially, which must have been a very tedious and difficult operation, when flint knives, sand, and water were the only available instruments. Having carried the grooves to the required depths, the projecting portions were removed by a skilful blow with a hammer, and the implement was then sharpened and polished on blocks of sandstone.

The axes appear to have been fastened into the handles by means of bitumen, obtained either from the Val de Travers near Neufchatel or from the Perte du Rhone.

The stone knives may be considered as of two sorts. Some differ from the axes principally in having their width

greater than their length. In other cases flint flakes were set in wooden handles and fastened, like the axes, by means of bitumen. Saws also (fig. 126) were made in a similar manner, but with their edges somewhat rudely dentated; we do not find in Switzerland any of the semi-lunar stone implements, which are frequent in Denmark. The arrow-heads were made of flint, or in some cases of rock crystal, and were of the usual forms. Spindle whorls of rude earthenware (fig. 165) were abundant in some of the Lake villages even of the Stone Age. This indicates a knowledge of weaving, which, as we shall presently see, is proved by even more conclusive evidence. There are also found rounded stones, pierced with one or sometimes two holes. The use of these is uncertain, but they may perhaps have been used to sink fishing lines.

FIG. 165.



Spindle Whorl (Stone Age).

The flint flakes offer no peculiarities; the Swiss specimens are, however, of small size. Corn-crushers, which are round balls of hard stone, two or three inches in diameter, occur even in the villages of the Stone Age.

The list of objects hitherto found at Wauwyl is as follows:

Stone axes, principally of serpentine	43	
Small flint arrow-heads	36	
Flint flakes	200	
Corn-crushers	16	Not all collected.
Rude stones used as hammers, common (say)	20	
Whetstones	26	
Slingstones, etc.	85	
In all about	426	articles of stone.

The flint, of which the flakes and arrow-heads were formed, must have come from a distance, and the best pieces in all probability were obtained from France. Visits may have been made to the French quarries, just as Catlin tells us that the American tribes, from far and near, visited the red pipestone quarry of Coteau des Prairies. A few fragments of Mediterranean coral have been found at Concise, and of Baltic amber at Meilen. Some archæologists have argued from these facts, that there must have been a certain amount of commerce even in the Stone Age. As, however, both these settlements appear to have belonged to the transitional period between the age of Stone and that of Bronze, it would be safer to refer both the amber and the coral to the later period.

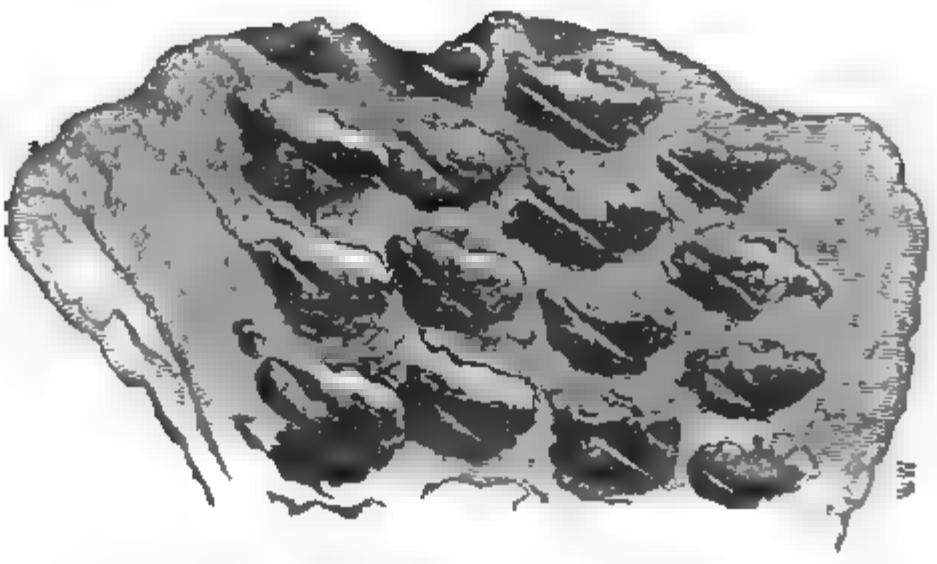
Like other savages, the Lake-dwellers made the most of any animal they could catch. They ate the flesh, used the skin for clothing, picked every fragment of marrow out of the bones, and then, in many cases, fashioned the bones themselves into weapons. The larger and more compact ones, as well as horns of the deer, served as hammers, and were used as handles for hatchets. In some cases, pieces of bone were worked to an edge, but they are neither hard nor sharp enough to cut well. Bone awls are numerous, and may have been used in preparing skins for clothes. Fig. 128 (p. 104) represents a chisel or scraper of bone, from Wangen. One purpose for which these were used was no doubt to scrape off the hair in dressing skins.

A few objects made of wood have also been found at Wauwyl and elsewhere; but these, even if originally numerous, would be difficult to distinguish from the surrounding peat, especially as it contains so many branches of trees and other fragments of wood; and it would also be very difficult to extract them entire. Perhaps, therefore, implements of wood may have been much more varied and

common than the collections would appear to indicate. Tinder has been found in several of the Lake villages, and was no doubt used in obtaining fire.

The pottery of the Stone Age presents nearly the same characters in all the settlements. Very rude and coarse, it is generally found in broken pieces, and comparatively few entire vessels have been obtained. There is no evidence that the potter's wheel was known, and the baking is very imperfect, having apparently taken place in an open fire. The material is also very rude, and generally contains numerous grains of quartz. The form is frequently cylindrical, but several of the jars are rounded at the base, and without feet. A curious character is the frequent presence of a row of depressions which do not completely penetrate the thickness of the vessel; but the commonest decorations are simple lines or furrows, made sometimes by a sharp instrument, some-

FIG. 166.

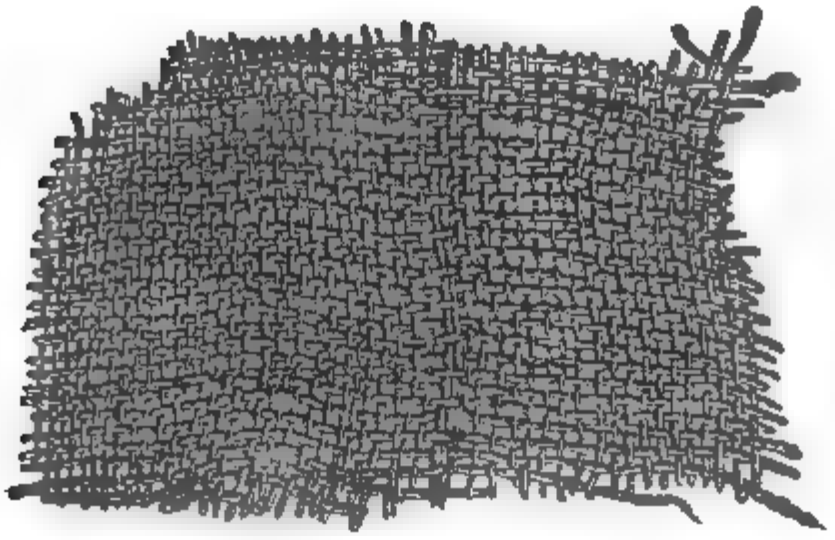


Piece of Pottery.—Lake of Zurich.

times by the finger-nail (see fig. 166), and occasionally produced by pressing a cord on the soft clay. Curved lines are rare; no representation of any animal has yet been met with; and the vase found at Wangen, which has been figured both by Dr. Keller and by M. Troyon, is almost the only instance in which any attempt has been made to repre-

sent a plant. In this case the design is ruder than might be inferred from the figures given. In some of the Bronze Age villages rings of pottery are found, which were evidently intended to serve as supports for these earthenware *tumblers*, but none of them have yet been met with in any of the Stone Age villages. Possibly the earthenware during the Stone Age rested on the soft earth, and tables were only introduced in the Bronze Age, when by means of metallic implements it became so much easier to cut wood, and particularly to make boards. Many of the vessels had small projections, which were pierced in such a manner that strings might be passed through them, and which may, therefore, have served for suspension. Some of the vessels, also, are pierced by small holes at different levels; it has been suggested that these may have been used in the preparation of curds, the

Fig. 168.



Piece of Tissue from Robenhausen.

small holes being intended to permit the escape of the milk. The ornaments on the pottery belonging to this age are of a very rude and simple character. Sometimes a row of knobs runs round the vase, just below the lip; this style of ornamentation is common on the pottery found by M. Gilliéron at the Pont de Thiéle.

Although there can be no doubt that the skins of animals

supplied the ancient Lakemen with their principal articles of clothing, still in several of the settlements, and especially at Wangen and Robenhausen, both of which belong to the Stone Age, pieces of rude fabric (fig. 168) have been found in some abundance. They consist either of flax fibres or straw. The presence of spindle-whorls has been already mentioned.

For our knowledge of the animal remains from the Pile-works we are almost entirely indebted to Prof. Rütimeyer, who has published two memoirs on the subject (Mittheilungen der Antiq. Gesellschaft in Zürich, Bd. xiii. Abth. 2, 1860; and, more recently, a separate work, Die Fauna der Pfahlbauten in der Schweiz, 1861). The bones are in a very fragmentary condition, and have been broken open for the sake of the marrow. There is also the same absence of certain bones and parts of bones, so that it is impossible to reconstruct a perfect skeleton even of the commonest animal.

The total number of species amounts to about seventy, of which ten are fishes, four reptiles, twenty-six birds, and the remainder quadrupeds. Of the latter, six species may be considered as having been domesticated; namely, the dog, pig, horse, goat, sheep, and at least two varieties of oxen. The bones very seldom occur in a natural condition; but those of domestic and wild animals are mixed together, and the state in which they are found, the marks of knives upon them, and their having been almost always broken open for the sake of their marrow, are all evidences of human interference.

Two species, the one wild, the other domestic, are especially numerous—the stag and the ox. Indeed, the remains of these two equal those of all the others together. It is, however, an interesting fact, that in the older settlements, as at Moosseedorf, Wauwyl, and Robenhausen, the stag exceeds the ox in

the number of specimens indicated, while the reverse is the case in the more modern settlements of the western lakes, as, for instance, those at Wangen and Meilen.

Next to these in order of abundance is the hog. Less numerous again, and generally represented by single specimens where the preceding occur in numbers, are the roe, the goat, and the sheep, which latter is most abundant in the later settlements. With these rank the fox and the martens. Foxes are occasionally eaten by the Esquimaux*, Captain Lyon seems to have taken rather a fancy to them†, and Franklin assures us that fox is better than lean venison‡. They also appear, whether from choice or necessity, to have been eaten during the Stone period. This conclusion is derived from the fact that the bones often present the marks of knives, and have been opened for the sake of the marrow. While, however, the fox is very frequent in the Pileworks of the Stone epoch, it has not yet been found in any settlement belonging to the Bronze period. Oddly enough, the dog is rarer than the fox, at least as far as the observations yet go, in the Lake-dwellings of the Stone period, though more common than the horse; and of other species but few specimens have been met with, though in some localities the beaver, the badger, and the hedgehog appear in some numbers. The bear and the wolf, as well as the urus, the bison, and the elk, seem to have occasionally been captured; it is probable that the latter species were taken in concealed pits.

From the small lake at Moosseedorf, M. Rütimeyer has identified the following list:—Of the dog, three specimens; fox, four specimens; beaver, five specimens; roe, six specimens; goat and sheep, ten specimens; cow, sixteen specimens; hog, twenty specimens; stag, twenty specimens. It is certainly very striking to find two wild species represented

* Crantz, History of Greenland, vol. i. p. 78.

† Lyon's Journal, p. 77.

‡ Franklin, vol. iii. pp. 219–239.

by the greatest number of specimens, and particularly so, since this is no exceptional case; but the whole sum of the wild exceeds that of the domesticated individuals, a result moreover, which holds good in other settlements of this epoch. Not only does this indicate a great antiquity, but also that the population must have been sometimes subjected to great privations, partly from the unavoidable uncertainty of supplies so obtained, partly because it is improbable that foxes would have been eaten except under the pressure of hunger.

The bones of the stag and the wild boar often indicate animals of an unusual magnitude, while, on the other hand, the fox appears to have been somewhat smaller than at present. The dogs varied less than they do now; in fact they all belong to one variety, which was of middle size, and appears to have resembled our present beagles. (M. Rütimeyer describes it as "resembling the Jagdhund" and the "Wachtelhund.")

The sheep of the Stone period differed from the ordinary form in its small size, fine legs, and short goat-like horns; particulars in which it is nearly resembled by some northern and mountain varieties at the present day, as, for instance, by the small sheep of the Shetlands, Orkneys, Welsh hills, and parts of the Alps. At Wauwyl, however, M. Rütimeyer found traces of an individual with large horns. Our knowledge of the wild species of sheep is so deficient, that M. Rütimeyer does not venture to express any opinion concerning the origin of the domestic varieties, but his present impression is that they will eventually be traced up to several wild races.

In his first memoir, Prof. Rütimeyer gives an interesting table, which, with some additions which I owe to his kind courtesy, is here subjoined, the relative frequency being indicated by numerals:

1 denotes a single individual;

2 indicates that the remains of several individuals have been met with;
3 the species which are common;
4 those which are very common; and lastly,
5 those which are present in great number.

LIST OF SPECIES.	Moosseedorf.	Wauwyl.	Robenhausen.	Wangen.	Meilen.	Concise.	Bienne.
1 Ursus Arctos	2	2	2	2	...	2	...
2 Meles vulgaris	2	2	3	...	1	3	...
3 Mustela Foina	2	3	3	2	...	1	...
4 „ Martes	2	3	3	2	1	2	...
5 „ Putorius	2	2	1	...	...	1	...
6 „ Erminea	...	2	...	...	...	...	...
7 „ Lutra vulgaris	1	1	2	...	...	...	...
8 Canis Lupus	...	1	1	1	1	1	...
9 „ familiaris (palustris)	2	2	2	3	3	3	3
10 „ Vulpes	3	3	3	2	2	2	...
11 Felis Catus (ferus)	2	2	1	...	...	...	...
12 Erinaceus europæus	1	1	3	2	...	...	...
13 Castor Fiber	3	2	3	2	...	2	...
14 Sciurus europæus	2	2	2	2	...	...	...
15 Mus sylvaticus	...	...	2	...	...	...	...
16 Lepus timidus	1	...	1	1	...	...	...
17 Sus Scrofa ferus	3	2	4	2	2	2	2
18 „ Palustris	5	5	3	5	5	3	3
19 „ Scrofa domesticus	...	1	...	...	...	2	2
20 Equus Caballus	1	2	2	2	1	2	3
21 Cervus Alces	1	1	2	...	2	1	1
22 „ Elaphus	5	5	5	5	5	5	5
23 „ Capreolus	4	2	4	2	2	3	...
24 Capra Ibex	...	...	...	...	1	...	...
25 „ Hircus	2	2	2	2	...	2	34
26 Ovis Aries	2	2	2	2	1	3	34
27 Antilope rupicapra	...	...	1	...	...	...	...
28 Bos primigenius	2	2	3	1	...	2	...
29 „ Bison	1	1	4	?	...	...	...
30 „ Taurus primigenius	2	?	5	?	2	5	2
31 „ Taurus brachyceros	5	5	2	5	5	2	5
32 „ Taurus frontosus	...	1	...	...	...	2	2

The almost entire absence of the hare is doubtless owing to the curious prejudice which was and is entertained by many races against the flesh of this animal. It was never eaten by the ancient Britons, and is avoided by the Lapps at

the present day. According to Burton* the Somal Arabs will not touch it, and M. Schlegel also states that the prejudice against it existed among the ancient Chinese†. Among the Hottentots it was eaten by the women, but was forbidden to men‡. It was regarded as unclean by the Jews, being erroneously supposed to chew the cud. According to Crantz, the Greenlanders §, if in want, will eat foxes rather than hares. Finally, its remains do not occur in the Danish shell-mounds.

The birds which have been discovered are:—

Aquila fulva. The golden eagle. At Robenhausen.
Aquila haliætus. A single bone found at Moosseedorf is rather doubtfully referred to this species by M. Rütimeyer.
Falco milvus. Robenhausen.
Falco palumbarius. Wauwyl, Moosseedorf.
Falco nisus. Moosseedorf.
Falco buteo. Moosseedorf, Robenhausen.
Strix aluco. Concise.
Strix otus.
Sturnus vulgaris. Robenhausen.
Corvus corone. „
Corvus corax. „
Cinclus aquaticus. „
Columba palumbus. „ Moosseedorf.
Tetrao bonasia. „
Tetrao lagopus. Moosseedorf.
Ciconia alba. Not unfrequent at Moosseedorf and Robenh.
Ardea cinerea. Robenhausen.
Grus cinerea.
Fulica atra. „
Larus. Two sp. „

* First Footsteps, p. 155.
† Notes and Queries on China, Japan, Hongkong, May, 1868.
‡ Le Vaillant, Voyages dans l'Afrique, vol. iv. p. 187.
§ History of Greenland, p. 73.

Cygnus olor. Robenhausen.
Anser segetum. „
Anas boschas. Robenhausen, Moosseedorf, Wauwyl.
Anas querquedula. „ „
Podiceps minor. Robenhausen.
Mergus merganser. „

The reptiles and fishes are represented by about ten of our commonest species.

The common mouse and our two house-rats, as well as the domestic cat, are absent from the Lake-habitations of Switzerland, as also from the Kjökkenmöddings of Denmark; the same is the case with the common fowl, which seems, moreover, to have been unknown to Homer and Hesiod; Prof. Rütimeyer attributes to a later period a single bone of the latter bird which was found at Morges, a settlement belonging to the Bronze period.

The earliest remains of the ass mentioned by Prof. Rütimeyer are those found at Chavannes and Noville, which, however, were not connected with Pfahlbauten, and belonged to post-Roman times. In the Bible the ass is first mentioned in the time of Abraham, who had "sheep, and oxen, and he-asses, and men-servants, and maid-servants, and she-asses, and camels*." It will be observed that in this enumeration no mention is made of horses. Laban, again, had sheep, and goats, and cattle, and camels, and asses, but apparently no horses. Again, the present which Jacob sent to Esau consisted of two hundred she-goats and twenty he-goats, two hundred ewes and twenty rams, thirty milch camels with their colts, forty kine and ten bulls, twenty she-asses and ten foals†. Indeed, no mention whatever is made of horses until the children of Israel went into Egypt; and from the copious and interesting details of their pastoral life, we may feel sure that horses would have

* Gen. xii. 16. † Gen. xxxiii. 14.

been alluded to if the Hebrews had possessed them. As regards Egypt, the horse is not represented on any of the monuments anterior to the 18th dynasty, after which, however, it appears to have become abundant in that country.

As regards the Swiss Lake-villages, it is singular, that though remains of the horse have been found in all the Pile-works, they are so rare that their presence may almost be considered accidental: thus, Wangen has only produced a single tooth; Moosseedorf, a metatarsal bone, which has been polished on one side; Robenhausen, a single Os naviculare tarsi; and Wauwyl, only a few bones, which may all have belonged to a single individual. On the other hand, when we come to the Bronze period, we find at Nidau numerous bones of this species; so that, as far as these slight indications go, the horse, even if present in the Stone Age, seems to have been rarer than at subsequent periods. All the remains of this animal belonged apparently to the domestic horse (Equus caballus), while those which occur in the Drift gravel beds and in caves fall into two well-marked races, named by Prof. Owen, E. fossilis and E. spelæus.

Though he refers some bones to the wild boar, and others to the domestic hog, yet Prof. Rütimeyer considers that the greatest number of the remains of this genus belong to a different race, which he calls Sus palustris. This variety was, in his opinion, less powerful and dangerous than the wild boar, the tusks being much smaller in proportion; in fact, he describes it as having, with the molar teeth of an ordinary full-grown wild boar, premolars, canines, and incisors resembling those of a young domestic hog. He considers that all the bones of this variety from Moosseedorf belonged to wild individuals, while of those from Nidau, Robenhausen, Wauwyl, and Concise, some bear, in his opinion, evidences of domestication. It has been supposed by some naturalists that this variety was founded only on female specimens, but

in his last work Prof. Rütimeyer combats this opinion at some length, and gives copious descriptions and measurements of the different parts. He also points out numerous sexual differences in the Sus palustris, of the same nature, but not so well marked, as those of the wild boar. Relying also on its well-defined geographical and historical range, he denies that it can be considered as a cross between the wild boar and domestic hog, or that the differences which separate it from the former can be looked upon as mere individual peculiarities. He considers, indeed, that as a wild animal it became extinct at a very early period, though the tame swine of India, which agree closely with this race, may perhaps have descended from it.

M. Schütz, on the contrary, regards the Sus palustris as derived from the Sus sennariensis, which still exists in central Africa, and does not think that it ever inhabited Switzerland in a wild state*. He moreover points out that the skulls of this animal found in the later Pfahlbauten differ considerably from those in the earlier ones, showing clearly the influence of domestication, and affording an additional indication that between the foundation of the earlier and later Lake-villages, a considerable period must have elapsed.

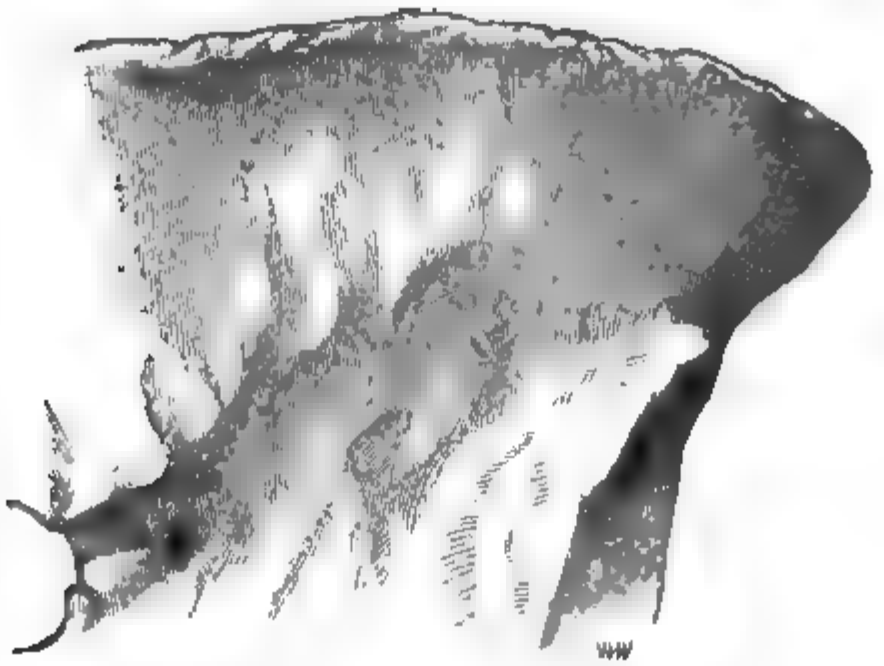
Our domestic hog first makes its appearance in the later Pileworks, as, for instance, at Concise. Prof. Rütimeyer does not, however, believe that it was tamed by the inhabitants of Switzerland, but is rather disposed to look upon it as having been introduced during the Bronze Age, and the more so, as he also finds at Concise traces of an ox (*B. trochoceros*) which does not occur in the earlier Pileworks.

The discovery of dung among the remains of the Pfahlbauten sufficiently proves that the Lake-dwellers had domestic animals, but there are also other indications from which we may draw the same conclusion

* Zur Kenntniss des Torfschweins. Berlin, 1868, p. 44.

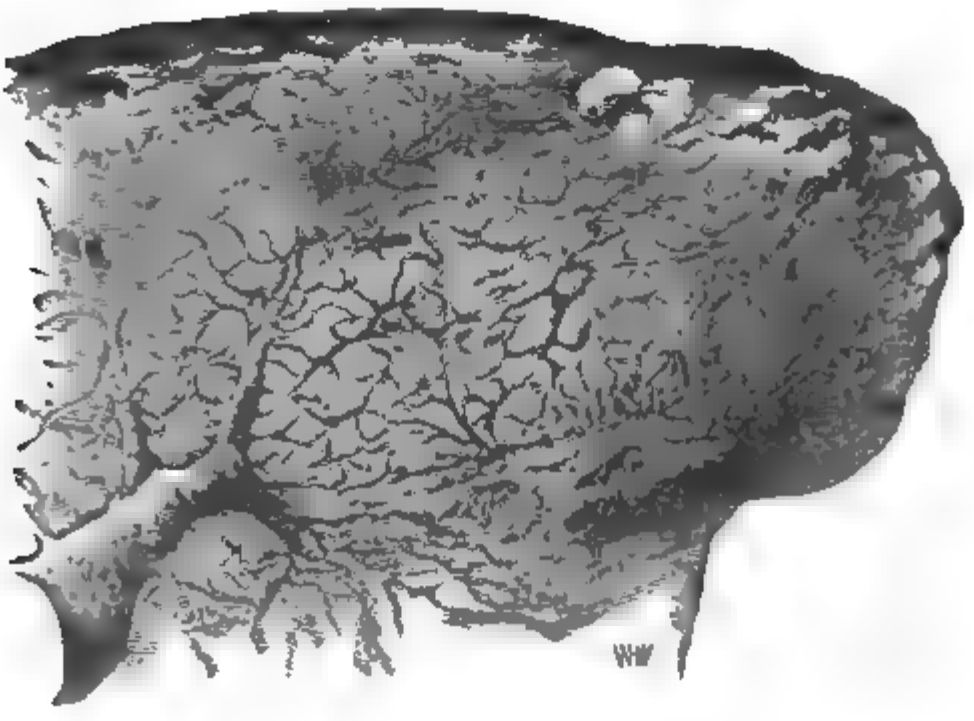
In endeavouring to ascertain whether any given bones belonged to a wild or domesticated animal, we must be guided by the following considerations: the number of indi-

FIG. 169.



Part of the Vertebra of a Cow.

FIG. 170.



Part of the corresponding Vertebra of the Bison.

viduals represented; the relative proportions of young and old; the absence or presence of very old individuals, at least

in the case of species that served for food; the traces of long, though indirect, selection, in diminishing the size of any natural weapons which might be injurious to man; the direct action of man during the life of the animal; and, finally, the texture and condition of the bones.

Applying these considerations to the Sus palustris from Moosseedorf, it is evident, says Prof. Rütimeyer, firstly, that the argument derivable from the number of young specimens loses much of its force on account of the great fertility of the sow, and the ease with which the young can be found and destroyed; secondly, in the number of individuals represented, it is equalled by the stag, which certainly was never domesticated; thirdly, some bones of very old individuals have been found, and some of very young, even of unborn pigs; the smallness of the tusks is, according to Prof. Rütimeyer, a characteristic of the race, and not an evidence of domestication; the bones are of a firm and close texture, and the only cases of decay have arisen from an extreme degradation of the teeth, which would certainly be unlikely to occur in a domestic animal. Finally, none of the teeth show traces of any filing or other preparation, except such as may have taken place after the death of the animal; from all which reasons Prof. Rütimeyer therefore infers that the inhabitants of Moosseedorf had not yet succeeded in taming either the Sus scrofa palustris or the Sus scrofa ferus.

Prof. Rütimeyer has paid great attention to the texture and condition of the bones themselves, and believes that he can, in many cases, from these alone distinguish the species, and even determine whether the bone belonged to a wild or a domesticated animal.

In wild animals the bones are of a firmer and closer texture; there is an indescribable, but to the accustomed eye very characteristic, sculpturing of the external surface, produced by the sharper and more numerous impressions of vessels,

and the greater roughness of the surfaces for the attachment of muscles There is also an exaggeration of all projections and ridges, and a diminution of all indifferent surfaces. The contrast thus produced will be seen from figs. 169 and 170, the first of which represents a portion of a vertebra belonging to a domestic cow, the second the corresponding surface of the same bone from the bison. In the consideration of the remains of oxen, these distinctions have proved of the greatest importance. By their assistance, Prof. Rütimeyer has convinced himself that besides the two wild species of bos, namely, the urus (*B. primigenius*) and the aurochs (*B. bison* or *Bison Europæus*), four principal races of domestic oxen occur in the Lake-villages*.

The first of these, the *Primigenius* race, closely resembles the Urus or Bos primigenius, and was no doubt descended from it. It occurs in all the earlier Pileworks, and in the present day is best represented by the wild cattle of Chillingham, and the great oxen of Friesland, Jutland, and Holstein.

The second, or *Trochoceros* race, resembles a fossil form first observed in the diluvium of Arezzo and Siena, and described by F. von Meyer. It has not hitherto been found in any of the Stone Age villages. Rütimeyer regards it as scarcely distinguishable from the urus, and observes that its peculiarities are principally, though not exclusively, developed in the female sex.

The third, or *Frontosus* race, occurs but sparingly in the older Pfahlbauten; becomes more frequent in the Bronze Age villages, and prevails at the present day in northern Switzerland. Prof. Rütimeyer considers this variety also as derived from the urus, and remarks that while the wild cattle of Chillingham are true to the primigenius form, some of the Lyme Park cattle approach to the frontosus type. He

* Ar. für Anthropologie, 1866, p. 219.

has, however, never seen a skull of this type belonging to an undoubtedly wild animal.

The fourth is the *Longifrons* or *Brachyceros* race. The name Brachyceros, by which it was at first known, must be abandoned, because it had been previously applied by Dr. Gray to an African ox. This variety is extremely abundant in all the Pfahlbauten. Prof. Rütimeyer regards it as descended, not from the urus, but from a second and smaller species. He remarks, however, that if it is derived from the urus, it is at least a more distinct, and must be an older variety than any of the preceding. Prof. Rütimeyer admits that we have no evidence that *B. longifrons* ever existed in a wild state in Central Europe.

M. de Quatrefages* considers that all our domestic oxen are descendants of the urus; while Mr. Darwin† regards B. longifrons and B. frontosus as the modern representatives of wild ancestors, specifically distinct from B. primigenius, and concludes therefore that our "domestic cattle are almost certainly the descendants of more than one wild form."

Mr. Boyd Dawkins has recently‡ shown that as far as this country is concerned, we have no conclusive evidence of more than two species of wild oxen, namely, the urus and the bison. The smaller varieties appear to have been introduced as domesticated animals, and do not go back beyond the Neolithic period. According to Nilsson, on the contrary, both the Bos frontosus and B. longifrons inhabited Sweden as wild races§. My own impression is that the urus was domesticated in Europe, but also that some at least of the early settlers brought domestic cattle with them, and these may very probably have belonged to a distinct wild race.

* Rev. des Cours Scientifiques, 1868, p. 563.

† Animals and Plants under Domestication, vol. i. p. 81.

‡ Boyd Dawkins, Geol. Jour. 1867, p. 182.

§ Ann. and Mag. of Nat. His. 1849, pp. 349-351.

Further evidence, however, is much needed on this interesting subject.

Making allowance then for the marine animals, such as seals, fish, oysters, cockles, whelks, etc., which we could not expect to find so far away from the sea, the fauna indicated by the remains found in the Swiss lakes agrees remarkably with that which characterizes the Danish Kjökkenmöddings, so far as wild animals are concerned, and belongs evidently to a far later age than that of the celebrated stone hatchets, which were first made known to us by the genius and perseverance of M. Boucher de Perthes.

Instead of the elephant and rhinoceros we find in the Neolithic or second Stone period—in that, namely, of the Kjökkenmöddings and "Pfahlbauten"—the urus and bison, the elk and the red deer already installed as monarchs of the forest. Even the reindeer is altogether absent. The red deer on the contrary, and the boar, appear to have been very frequent, and to have formed a most important article of food to the Lake-dwellers. The urus, or great fossil ox, is now altogether extinct, at least as a wild species*. It is mentioned by Cæsar, who describes it as being little smaller than an elephant. (Hi sunt magnitudine paulo infra elephantos specie et colore et figurâ tauri). According to Herberstein, it still existed in Germany during the sixteenth century, soon after which, however, it must have become extinct.

The aurochs, or European bison, seems to have disappeared from Western Europe at about the same period as the urus. There is no historical record of its existence in England or Scandinavia. In Switzerland we cannot trace it later than the tenth century; but it is mentioned in the "Niebelungen

* Prof. Rütimeyer, as I have already mentioned, considers that the celebrated wild cattle of Tankerville Park are unmistakable, though dwarfish, descendants of the B. primigenius.

Lied," of the twelfth century, as occurring in the Forest of Worms, and in Prussia the last was killed in the year 1775. At one period, indeed, it appears to have inhabited almost the whole of Europe, much of Asia, and part even of America, but at present it is confined in Europe to the imperial forests in Lithuania, where it is preserved by the Emperor of Russia; while, according to Nordmann and Yon Baer, it still exists in some parts of Western Asia.

We have no notice of the existence of the elk in Switzerland during the historical period, but it is mentioned by Cæsar as existing in the great Hercynian forest; and even in the twelfth century it was to be met with in Sclavonia and Hungary, according to Albertus Magnus and Gesner. In Saxony, the death of the last is recorded as having occurred in 1746. At present it inhabits Prussia and Lithuania, Finland and Russia, Scandinavia and Siberia, to the shores of the Amoor.

The ibex disappeared from most of the Swiss Alps, perhaps not much later than the elk. It has lingered longest in the West. In Glarus the last one perished in 1550, though near Chiavenna it existed until the commencement of the seventeenth century, and in the Tyrol until the second half of the eighteenth, while a few still exist in the neighbourhood of Mont Iséran, where they are protected by the King of Italy.

The extermination of the bear, like that of the ibex, seems to have begun in the East, and is not yet complete, since this animal still occurs in the Jura and the Grisons, whence it occasionally visits the Valais, and the south-eastern parts of Switzerland. The fox, the otter, and the different species of weasels, are still the common carnivora of Switzerland, and the wild cat, the badger, and the wolf, still occur in the Jura and the Alps, the latter in cold winters venturing even into the plains. The beaver, on the contrary, has at last disappeared. It had long been very rare in Switzerland, but

a few survived until the beginning of the present century in Lucerne and Valais. Red deer were abundant in the Jura and Black Forest in the twelfth and thirteenth centuries, though they do not appear to have been so large as those which lived in earlier times. The last was shot in the canton of Basle, at the close of the eighteenth century, while in western Switzerland and Valais they lingered somewhat longer. The roedeer still occurs in some places.

It appears, therefore, that the animals of the Swiss Pileworks belong to the fauna, which has occupied Europe from the commencement of the Palæolithic period down to the present time.

While, however, we must regard the fauna of the Stone Age as belonging to the same great zoological epoch with that of the river drift gravels on the one hand, and the present time on the other, we cannot forget that the immense period which has elapsed since the end of the tertiary period has produced great changes in the fauna of Europe. In this post-tertiary era the Pileworks occupy, so to say, the middle position. Distinguished from the present fauna of Switzerland by the possession of the urus, the bison, the elk, the stag, and the wild boar, as well as by the more general distribution of the beaver, the bear, the ibex, etc., their fauna differs from that of the drift gravels in the absence of the mammoth, the rhinoceros, the musk ox, the cave hyæna, and the reindeer.

Prof. Rütimeyer thinks that from similar considerations alone, even if we had no other evidence, we might carry this division farther; and if we take the settlements at Moosseedorf, Wauwyl, Robenhausen, and Nidau, which have been the most carefully studied in this respect, it certainly appears that the three former, which belong to the Stone Age, offer a marked contrast to the latter, which is the locality whence the largest number of bronze objects has as yet been obtained.

It is of course unnecessary to point out the interest and importance of such a distinction, which accords so well with that indicated by the study of the weapons and the state of preservation of the piles. Thus, the urus has only occurred at Moosseedorf, Wauwyl, Robenhausen, Wangen, and Concise; the aurochs only at Moosseedorf, Wauwyl, and Robenhausen; the bear only at Moosseedorf, Wauwyl, Robenhausen, Wangen, and Concise. A glance at the table given at page 192 will show that several other species have as yet only occurred at Moosseedorf and Robenhausen; a fact, however, which indicates, perhaps, rather the richness than the antiquity of these localities. Possibly we may consider the presence of these larger species as an indication of their greater abundance in the oldest period; but we must not forget that not only the bear and the elk, but also the aurochs and the urus appear at a comparatively late period. On the other hand, the abundance of wild animals, and the fact that at Moosseedorf and Wauwyl the fox was more abundant than the dog, while elsewhere the reverse is the case, certainly speak in favour of the greater antiquity of these two settlements.

The evidence derived from the distribution of the domestic animals, is, perhaps, more satisfactory. The sheep is present even at Moosseedorf, though not so numerous as at Nidau. On the other hand, the horse is frequent at Nidau, while at Moosseedorf only a single bone of this animal was discovered, in a different condition from that of the other bones, and probably more recent. Finally, the domestic hog of the present race is absent from all the Pileworks of the Stone period, excepting the one at Wauwyl, and becomes frequent only at Nidau. The following table shows the proportions of wild and tame animals at Wauwyl, Moosseedorf, as representing the Age of Stone, and at Nidau, as perhaps the best illustration of that of Bronze. 1 represents a single indi-

vidual; 2, several; 3, the species which are common; 4, those which are very common; and 5, those which are present in large numbers.

Wild Animals.	Wauwyl.	Moosseedorf.	Nidau.
Brown Bear	2	2	...
Badger	2	2	...
Marten	3	2	...
Pine Marten	3	2	...
Polecat	2	2	...
Wolf	1	...	...
Fox	3	3	...
Wild Cat	2	2	...
Beaver	2	3	...
Elk	1	1	1
Urus	...	1	...
Bison	1	1	...
Stag	5	5	5
Roe Deer	2	4	...
Wild Boar	2	3	...
Marsh Boar*	5	5	3
Domestic Animals.			
Domestic Boar	?1	...	3
Horse	2	?1	3
Ox	5	5	5
Goat	2	2	3
Sheep	1	2	4
Dog	2	2	3

If succeeding investigations confirm the conclusions thus indicated, we may infer that the domestic animals, which were comparatively rare in the Stone period, became more frequent after the introduction of bronze; a change which indicates and perhaps produced an alteration of habits on the part of the inhabitants.

Rare, indeed, as they may have been, oxen, horses, sheep, and goats could not be successfully kept through the winter in the climate of Switzerland, without stores of provisions and some sort of shelter. A pastoral people, therefore, must have reached a higher grade than a mere nation of hunters.

* Considered by Prof. Rütimeyer to have been at first wild, but domesticated at Nidau and in the later Pfahlbauten.

We know, moreover, in another way, that at this period agriculture was not entirely unknown. This is proved in the most unexpected manner, by the discovery of carbonized cereals at various points. Wheat is most common, having been discovered at Meilen, Moosseedorf, and Wangen. At the latter place, indeed, many bushels of it were found, the grains being united in large thick lumps. In other cases the grains are free, and without chaff, resembling our present wheat in size and form, while more rarely they are still in the ear. Ears of the Hordeum hexastichon L. (the six-rowed barley) are somewhat numerous. This species differs from the H. vulgare L. in the number of rows and in the smaller size of the grains. According to De Candolle, it was the species generally cultivated by the Ancient Greeks, Romans, and Egyptians. In the ears from Wangen, each row has generally ten or eleven grains, which, however, are smaller and shorter than those now grown.

Three varieties of wheat were cultivated by the Lake-dwellers, who also possessed two kinds of barley, and two of millet. Of these the most ancient and most important were the small six-rowed barley and small "Lake-dwellers" wheat. The discovery of Egyptian wheat (Triticum turgidum) at Wangen and Robenhausen, is particularly interesting. Oats were cultivated during the Bronze Age, but are absent from all the Stone Age villages. Rye also was unknown.

Wheat and millet only seem to have been used for making bread. Prof. Heer thinks the barley was probably roasted. In the six-rowed barley the husks adhere very closely to the grain, and it would have been difficult to separate them; when roasted, however, they are easily detached from one another.

Still more unexpected was the discovery of bread, or rather cakes, for their texture is so solid that leaven does not appear to have been used. They were flat and round,

from an inch to fifteen lines in thickness, and, to judge from one specimen, had a diameter of four or five inches. In other cases the grains seem to have been roasted, coarsely ground between stones, and then either stored up in large earthenware pots, or eaten after being slightly moistened. Grain prepared in a similar manner is even now eaten in Germany and Switzerland. In what way the ground was prepared for the cultivation of corn we know not, as no implements have as yet been discovered, which can with certainty be regarded as agricultural.

Carbonized apples have been found at Wangen, sometimes whole, sometimes cut into two or more rarely into four pieces, and evidently dried and put aside for winter use. They have occurred not only at Wangen, but also at Robenhausen in Lake Pfeffikon, and at Concise in Lake Neufchatel. They are small, and resemble generally those which still grow wild in the Swiss forests; at Robenhausen, however, specimens have occurred which are of larger size and were probably cultivated. No traces of the vine, the walnut, the cherry, or the damson have yet been met with, but stones of the wild plum and the Prunus padus have been found. Seeds of the raspberry and blackberry, and shells of the hazel-nut and beech-nut occur plentifully in the mud, but those of the strawberry are rare. Peas have been found at Moosseedorf, but beans do not appear until the Bronze Age.

From all this, therefore, it is evident that the nourishment of the dwellers in the Pileworks consisted of corn and wild fruits, of fish, and the flesh of wild and domestic animals. Doubtless also milk was an important article of their diet.

Altogether 115 species of plants have been determined. The wild species are almost entirely the same as those now living; the Silene cretica, however, a South European weed, which was doubtless introduced originally and accidentally with the cereals, and which has been found at Robenhausen,

does not now inhabit Switzerland, and the Drapa natans, which was used as food by the inhabitants of Moosseedorf and Robenhausen, was supposed to be extinct in Switzerland, but is now known to occur in one locality.

I subjoin a table which I have compiled from Dr. Heer's memoir, which shows the more interesting species and varieties.

	STONE AGE.		TRANSITION.	BRONZE AGE.		
	Wangen.	Moosseedorf.	Robenhausen.	Monteller.	Parma.	Peter's Island.
1 Hordeum hexastichon sanctum	...	...	*	...	...	...
2 „ „ densum	...	...	*	*	*	...
3 „ distichum	*	...	...	...	...	...
4 Triticum vulgare antiquorum	*	*	*	...	...	*
5 „ „ compactum muticum	*	*	*	*	*	*
6 Triticum turgidum (Egyptian wheat)	*	...	*	...	...	...
7 Triticum spelta	...	...	...	...	...	*
8 „ dicoccum	*	...	...	...	...	...
9 „ monococcum	*[1]	...	...	...	...	...
10 Secale cereale	...	...	...	...	...	...
11 Avena sativa (Oats)	...	...	...	*	...	*
12 Panicum miliaceum	*	...	...	*	...	...
13 Setaria italica	...	...	*	*	...	...
14 Silene cretica	...	...	*	...	...	...
15 Centaurea cyanus	...	...	*	...	...	...
16 Pastinaca sativa	...	*	...	...	...	...
17 Faba vulgaris	...	...	...	*	*	*
18 Pisum sativum	...	*	...	...	...	*
19 Ervum lens	...	...	...	...	...	*
20 Pyrus malus (small crab apple)	*	*	*	...	...	...
21 Trapa natans	...	*	...	...	...	...
22 Linum angustifolium	*	*	*	...	...	...

Neither hemp, oats, nor rye have yet been found. Small pieces of twine and bits of matting made of flax may have been part of some article of clothing. For this purpose also there can be little doubt that the skins of animals were used,

[1] Only one ear, subsequently lost.

fragments of leather have been met with, and some of the stone implements seem well adapted to assist in their preparation, while the bone pins, and the needles made from the teeth of boars, may have served to fasten them together.

Dr. Heer, from whose very interesting memoir* the above facts are borrowed, calls particular attention to the fact that, while the remains of wild species found in the Pfahlbauten agree in the most minute particulars with those still living in Switzerland, the cultivated plants, on the contrary, differ from all the existing varieties, and invariably have smaller seeds or fruits. Man has evidently in the course of time effected considerable improvements. It is also very interesting to observe how the evidence derived from these Swiss Lake-dwellings agrees with the evidence contained in the most ancient writings that have come down to us. Thus flax is mentioned in the Pentateuch and in Homer, it was also largely used by the ancient Egyptians, while hemp seems to have been unknown until a later period. So also wheat and barley, but neither oats nor rye† are mentioned in Exodus or by Homer. Even in the time of David, when Barzillai the Gileadite‡ "brought beds, and basins, and earthen vessels, and wheat, and barley, and flour, and parched corn, and beans, and lentiles, and parched pulse, and honey, and butter, and sheep, and cheese of kine," it will be observed that neither oats nor rye are mentioned. Flax also is mentioned nine times in the Old Testament, and linen thirteen times, but hemp not once.

To what race of men these interesting remains are ascribable we have as yet no direct evidence. Human bones are very rare in the Pileworks, and may probably be referred to accidents, especially as we find that those of children are

* Die Pflanzen der Pfahlbauten.

† According to the best Hebrew scholars, the word translated "rye" in Exodus ix. 32, really means spelt.

‡ 2 Sam. xviii. 28.

most numerous. M. Desor, indeed, states that not a single human skeleton has yet been found in any of the stations belonging to the Stone Age, and Dr. Keller, in his fifth report, informs us that all the Lake-villages taken together have not yet produced more than half a dozen. One mature skull from Meilen has been described by Professor His, who considers that it does not differ much from the ordinary Swiss type. While his work was in the press, Prof. Rütimeyer received from Col. Schwab four more skulls, two of which were obtained at Nidau, one at Sutz, and one at Biel. Another skull shown to me by Professor Desor, and found at Auvernier, completes the number mentioned by Dr. Keller. All these settlements, however, appear to have belonged to the Bronze Age, nor has it yet been possible certainly to refer any of the ancient tumuli found in Switzerland to the earlier period.

Passing now to the Lake-habitations belonging to the Bronze Age, we find that they are less generally distributed than those of the earlier period. They have as yet been found principally on the Lakes of Geneva, Luissel, Neufchatel, Morat, Bienne, and Sempach; scarcely any in eastern Switzerland. It has been supposed from this that the Age of Stone lasted longer in the east than in the west, and that flint and serpentine were in use on Lake Constance long after bronze had replaced them on the western lakes. We can, however, hardly suppose that the inhabitants of Inkwyl and Moosseedorf in Berne, who imported flint from France, can have been ignorant of the neighbouring civilization on the Lake of Bienne. Moreover, one settlement of the Bronze Age has been found on the Lake of Constance; but as the question now stands, Pileworks of the Metallic period are almost peculiar to western and central Switzerland. The constructions of the Bronze Age are more solidly built, but do not otherwise appear to have differed materially from

those of the Stone Age. They are often, however, situated farther from the land and in deeper water, partly no doubt on account of the greater facility of working timber, but partly also, perhaps, because more protection was needed as the means of attack were improved. The principal objects of bronze are swords, daggers, axes, spear-heads, knives, fish-hooks, sickles, pins, rings, and bracelets. The number of these articles which have been discovered is already very great, the collection of Col. Schwab alone containing no less than 4346 objects of metal. They are classified in the table in p. 43, which gives an idea of the relative proportions in which they occur.

Many of them are really beautiful, and as bronze must have been at that early period of considerable value, it is difficult to understand how so many can have been left uncared for and forgotten, along the shallow margins of the Swiss lakes. "Il est évident," says Prof. Desor, "que ce ne sont pas des rebuts qui se seraient perdus, sans qu'on s'en inquiétât. Ils ne sont pas tombés à l'eau par hasard, non plus que cette quantité de vases qui sont accumulés sur certain points, ni les jattes à provisions qu'on retire intactes." On the whole he is inclined to think that in some of these cases at least, we have "de simples magasins destinés aux ustensiles et aux provisions, et qui auraient été détruits par l'incendie, comme semble l'indiquer la trace du feu que montrent fréquemment les poutres aussi bien que les vases en terre. On expliquerait ainsi comment il se fait que les objets en bronze sont presque tous neufs, que les vases sont entiers et réunis sur un seul point. Cette hypothèse semble corroborée par l'opinion de plusieurs de nos chercheurs d'antiquités les plus expérimentés, qui pretendent que l'on n'a chance de faire de bonnes trouvailles que là où les pieux sont brûlée, tandis que l'on perd son temps à fouiller les stations où les pieux ne sont pas charbonnés." Col. Schwab

however, than whom no man has had more experience in such matters, while agreeing that comparatively little is ever found except in such Lake-villages as show traces of fire, expresses himself decidedly, and I think with reason, against the "bazaar" theory.

It has been suggested that the early inhabitants of Switzerland may have worshipped the Lakes, and that the beautiful bracelets, etc., may have been offerings to the gods. In fact, it appears from ancient writers that among the Gauls, Germans, and other nations, many lakes were regarded as sacred. M. Aymard (Étude Archéol. sur le Lac du Bouchet. Le Puy. 1862) has collected several instances of this kind. According to Cicero*, Justin†, and Strabo‡, there was a lake near Toulouse in which the neighbouring tribes used to deposit offerings of gold and silver. Tacitus, Pliny, and Virgil also mention the existence of sacred lakes. Again, so late as the sixth century, Gregory of Tours, who is quoted by M. Troyon and M. Aymard, tells us (De Glor. Confes. chap. ii.) that on Mount Helanus there was a lake which was the object of popular worship. Every year the inhabitants of the neighbourhood brought to it offerings of clothes, skins, cheeses, cakes, etc. Traces of a similar superstition may still be found lingering in the remote parts of Scotland and Ireland; in the former country I have myself seen a sacred spring surrounded by the offerings of the neighbouring peasantry, who seemed to consider pence and halfpence as the most appropriate and agreeable sacrifice to the Spirit of the Waters. Neither the coarse, broken pottery, the castaway fragments of bones, nor the traces of habitations, can, however, be accounted for in this manner§.

The pottery of the Bronze period is more varied and more

* De Nat. Deor. lib. iii. xxx.
† Just. xxxii. iii.
‡ Geog. vol. iv.

§ See also Wylie "On Lake-dwellings of the Early Periods." Archæol. vol. xxxviii. p. 181.

skilfully made than that of the Stone Age, but the potter's wheel does not seem to have been in use. Rings of earthenware are common, and appear to have been used as supports for the round-bottomed vases. The ornaments are of the same general character as those on the objects of bronze. Many of the large urns appear to have been used as store-places for the grain, etc., which were collected during the summer for the winter's use. In the absence, perhaps, of boxes and cupboards, even ornaments and instruments seem to have been kept in large jars. Some beautiful bracelets were found with several sickles in a jar at Cortaillod. Pieces of pottery, distorted by fire during the process of baking, have, according to M. Troyon, been found in many of the Lake-villages, whence he concludes that the pottery was manufactured on the spot.

Colonel Schwab has found at Nidau more than twenty crescents made of earthenware, and with the convex side flattened to serve as a foot. They are compressed at the sides, sometimes plain, sometimes ornamented, from ten to twelve inches wide, and six to eight in height. Dr. Keller was at first inclined to regard them as emblems of moon worship, but it is more probable that they were pillows*. Though this seems at first very unlikely, and they must, one would think, have been very uncomfortable, still we know that several barbarous races at the present day use wooden pillows or neck-rests of the same kind, as, for instance, the Feegeeans, who, having enormous heads of hair, sacrifice comfort to vanity, and use a mere wooden bar as a pillow. The very long bronze pins found with these "crescents" indicate that during the Bronze Age the hair was worn very long and carefully arranged.

M. Troyon is of opinion that the inhabitants of Switzerland during the Bronze Age were of a different race from

* Vogt's Lectures on Man, p. 368.

those who had lived there during the earlier period, and he agrees with some of the Scandinavian archæologists in regarding them as the true "Celts," and in attributing to them the habit of burning their dead. "Dès que le bronze se répand en Europe, l'incinération devient d'un usage général. L'apparition d'un nouveau peuple répond évidemment à celle de ce métal. L'urne cinéraire, de même que la tombe cubique, se retrouve sous la surface du sol ou dans le tumulus, mais celui-ci généralement moins élevé que dans l'âge primitif, ne recouvre plus guère de salle funéraire. Quand on voit combien il est rare que le bronze accompagne le premier mode d'inhumation, on doit reconnaître que l'envahisseur est resté maître du sol; du reste il ne pouvait en être autrement de la part d'un peuple possédant des armes en métal, or ces armes sont celles des anciens Celtes qui n'inhumaient point leur morts, mais les livraient au flammes du bûcher. L'incinération étant une partie intégrante de leurs pratiques religieuses, et l'urne cinéraire devenant d'un usage général avec le bronze, il en résulte que le Celte n'est pas le premier habitant de l'Europe dans laquelle il a introduit les arts metallurgiques." It would be very desirable to have some statistics, in order that we might appreciate the value of the evidence to be derived from these Swiss tumuli. M. Troyon relies on the fact that many of the Lake-villages were destroyed by fire, and that when, as appears to have been the case at several places, they were rebuilt during the Bronze Age, this was done, not exactly on the same spot, but farther away from the bank. Dr. Keller, on the other hand, considers that the primitive population did not differ, either in disposition (anlage), mode of life, or industry, from that which was acquainted with the use of bronze; and that the whole phenomena of the Lake-villages, from their commencement to their conclusion, indicate clearly a gradual and peaceable development. The number of instances in

which Lake-villages had been destroyed by fire has been, he considers, exaggerated. Of the settlements on the Lakes of Bienne and Neufchatel, amounting in all to sixty-six, only a quarter have, according to Col. Schwab, shown any traces of combustion; a proportion which is, perhaps, not greater than might have been expected, remembering that the huts were built of wood, and in all probability covered by thatch. Moreover, if these conflagrations had resulted from the attacks of enemies, we ought surely to have found numerous remains of the slain, whereas all the Lake-villages together have not as yet supplied us with the remains of more than half a dozen human skeletons.

It must, I think, be confessed that the arguments used by M. Troyon do not justify us in believing with him that the introduction of bronze was accompanied by an entire change of population. The construction of Lake-dwellings is a habit so unusual, that the continuance of similar habitations during the Bronze Age seems to me a strong argument against any such hypothesis.

Towards the close of the Bronze Age the Lake-villages appear to have gradually become less numerous. During the Stone Age they were spread over the whole country. Bronze Age settlements are very rare in the east of Switzerland, and the Iron Age is represented only on the Lakes of Bienne and Neufchatel. In these settlements not only has a new substance made its appearance, but the forms of the implements are different. We have, indeed, copies of the bronze axes made in iron, just as we found before that some of the earlier bronze celts resembled the stone axes in form; but these are exceptional cases. The swords have larger handles, and are more richly ornamented; the knives have straight edges; the sickles are larger; the pottery is more skilfully made, and is of the kind generally known as Roman; coins occur, the personal ornaments are more varied, and glass for the first time

makes its appearance. Bronze also is present; but in the first place it is no longer used for weapons, and in the second it is worked in a different manner, being hammered*, while, as already mentioned, all the objects of the Bronze Age are cast.

A field of battle at Tiefenau, near Berne (see p. 7), is remarkable for the great number of iron weapons and implements which have been found on it. Pieces of chariots, about a hundred swords, fragments of coat of mail, lance-heads, rings, fibulæ, ornaments, utensils, pieces of pottery and of glass, accompanied by more than thirty Gaulish and Massaliote coins of a date anterior to our era, enable us to refer this battle-field to the Roman period. About forty Roman coins have also been found at the small island on the Lake of Bienne.

After this period we find no more evidences of Lake-habitations on a large scale. Here and there, indeed, a few fishermen may have lingered on the half-destroyed platforms, but the wants and habits of the people had changed, and the age of the Swiss Pileworks was at an end.

We have, however, traced them through the ages of Stone and Bronze down to the beginning of the Iron period. We have seen evidences of a gradual progress in civilization, and improvement in the arts, an increase in the number of domestic animals, and proofs at last of the existence of an extended commerce. We found the country inhabited only by rude savages, and we leave it the seat of a powerful nation. Changes so important as these are not effected in a day; the progress of the human mind is but slow; and the gradual additions to human knowledge and power, like the rings in trees, enable us to form some idea how distant must be the date of their commencement. So varied, however, are the conditions of the human mind, so much are all nations affected

* See Desor, Les Constructions lacustres du Lac de Neuchatel, p. 27.

by the influence of others, that when we attempt to express our impressions, so to say, in terms of years, we are baffled by the complexity of the problem.

Some attempts have, indeed, been made to obtain a more definite chronology, and they will be alluded to in a later chapter. Though we must not conceal from ourselves the imperfection of the archæological record, still we need not despair of eventually obtaining some approximate chronology. Our knowledge of primitive antiquity has made an enormous stride in the last ten years, and we may fairly look forward with hope to the future.

The Swiss archæologists are continuing their labours, and they may rest assured that we in England await with interest the result of their investigations. Few things, indeed, can be more interesting than the spectacle of an ancient and long-forgotten people thus rising, as it were, from the waters of oblivion, to take that place which properly belongs to it in the history of the human race.

CHAPTER VII.

THE DANISH KJÖKKENMÖDDINGS, OR SHELL-MOUNDS.

DENMARK occupies a larger space in the history, than on the map of Europe; the nation is greater than the country. Though, with the growth of physical power in surrounding populations, she has lost much of her influence in political councils, and has been recently deprived of a great part of her ancient possessions, still the Danes of to-day are no unworthy representatives of their ancestors. Many a larger nation might envy them the position they hold in science and in art, and few have contributed more to the progress of human knowledge. Copenhagen may well be proud both of her museums and of her professors, and I would especially point to the celebrated Museum of Northern Antiquities, as being most characteristic and unique.

For the formation of such a collection Denmark offers great opportunities. The whole country appears to have been, at one time, thickly studded with tumuli: where the land has not been brought into cultivation, many of them are often in sight at once, and even in the more fertile and thickly populated parts, the plough is often diverted from its course by one of these ancient burial places. Fortunately, the stones of which they are constructed are so large and so hard, that their destruction and removal is a laborious and expensive undertaking. While, however, on the one hand, land grows gradually more valuable, and the stones themselves are more and more coveted for building or other

purposes: on the other, the conservative traditions, the feeling of superstitious reverence for the dead, which have so long protected them from desecration, is gradually becoming weaker; and it is estimated that not a day passes without witnessing the destruction of one or more of these tumuli, and the loss of some perhaps almost irrecoverable link in the history of the human race.

Many of these barrows, indeed, contain in themselves a small collection of antiquities, and the whole country may even be considered as a museum on a great scale. The peat bogs, which occupy so large an area, may almost be said to swarm with antiquities, and Professor Steenstrup estimates that, on an average, every column of peat three feet square contains some specimen of ancient workmanship. All these advantages and opportunities, however, might have been thrown away, but for the genius and perseverance of Professor Thomsen, who may fairly be said to have created the museum over which he so long and so worthily presided.

In addition to the objects collected from the tumuli and the peat bogs, and to those which have been found from time to time scattered at random in the soil, the Museum of Northern Antiquities contains an immense collection of specimens from some very interesting shell-mounds, which are known in Denmark under the name of "Kjökkenmöddings," and were long supposed to be raised beaches, like those which are found at so many points along our own shores. True raised beaches, however, necessarily contain a variety of species; the individuals are of different ages, and the shells are, of course, mixed with a considerable quantity of sand and gravel. But it was observed, in the first instance, I believe, by Professor Steenstrup, that in these supposed beaches, the shells belonged entirely to full-grown, or to nearly full-grown, individuals: that they consisted of four species which do not live together, nor require the same

conditions, and would not, therefore, be found together alone in a natural deposit: and thirdly, that the stratum contained scarcely any gravel, but consisted almost entirely of shells.

The discovery of rude flint implements, and of bones still bearing the marks of knives, confirmed the supposition that these beds were not natural formations, and it subsequently became evident that they were, in fact, the sites of ancient villages; the primitive population having lived on the shore and fed principally on shell-fish, but partly also on the proceeds of the chase. In many places hearths were discovered consisting of flat stones, arranged in such a manner as to form small platforms, and bearing all the marks of fire. The shells and bones not available for food gradually accumulated round the tents and huts, until they formed deposits generally from three to five feet, but sometimes as much as ten feet in thickness, and in some cases more than three hundred yards in length, with a breadth of from one hundred to two hundred feet. The name Kjökkenmödding, applied to these mounds, is derived from Kjökken, "kitchen," and mödding (corresponding to our local word midding), "a refuse heap," and it was, of course, evident that a careful examination of these accumulations would throw much light on the manners and civilization of the then population.

Under these circumstances a committee was formed, consisting of Professor Steenstrup, the celebrated author of the treatise "On the Alternation of Generations," Professor Forchhammer, the father of Danish Geology, and Professor Worsaae, the well-known archæologist: a happy combination, promising the best results to biology, geology, and archæology. Much was naturally expected from the labours of such a triumvirate, and the most sanguine hopes have been fulfilled. More than fifty of the deposits have been carefully examined, many thousand specimens have been col-

lected, ticketed, and deposited in the Museum at Copenhagen, and the general results have been embodied in six Reports, presented to the Academy of Sciences at Copenhagen*.

It is from these reports, and from the excellent Memoir by M. Morlot, that the following information has principally been derived. Being, however, anxious to present to my readers a complete and accurate account of these interesting shell-mounds, I have twice visited Denmark; first in 1861, with Professor Busk, and again in the summer of 1863. On both these occasions, through the kindness of Professor Thomsen and Herr K. Herbst, every facility has been afforded me of examining the large collections made in different Kjökkenmöddings, in addition to which I had the great advantage of visiting several of the shell-mounds under the guidance of Professor Steenstrup himself—especially one at Havelse in 1861, and those at Meilgaard and Fannerup, in 1863.

Mr. Busk and I also visited by ourselves one at Bilidt, on the Isefjord, close to Fredericksund; but this is one of the places at which it would seem that the inhabitants cooked their dinners actually on the shore itself, so that the shells and bones are much mixed up with sand and gravel; and we were not very successful in the search for flint implements. At Havelse, on the contrary, the settlement was on rather higher ground, and, though close to the shore, quite beyond the reach of the waves; the shells and bones are, therefore, almost unmixed with extraneous substances. At this place the Kjökkenmödding is of small extent, and is in the form of an irregular ring, enclosing a space on which the ancient dwelling or dwellings probably stood. In other cases, where

* Untersögelser i geologisk-antiquarisk Retning af G. Forchhammer, J. Steenstrup, og J. Worsaae. M. Morlot also has published an excellent abstract of the Reports in the Mém. de la Société Vaudoise, t. vi. 1860.

the deposit is of greater extent, as, for instance in the celebrated shell-mound at Meilgaard, the surface is undulating, the greater thickness of the shelly stratum in some places apparently indicating the arrangement of the dwellings. When the shell-mound at Havelse was previously visited by Professor Steenstrup, the shells were being removed to serve as manure, and the mound, presenting a perpendicular section, was in a very favourable condition for examination. The small pit thus formed had, however, been filled in; so that we were obliged to make a fresh excavation. In two or three hours we obtained about a hundred fragments of bone, many rude flakes, slingstones, and flint fragments, together with nine rude axes of the ordinary "shell-mound" type (figs. 108–110), several of which, however, were picked up on the surface.

Our visit to Meilgaard in 1863 was even more successful. This, which is one of the largest and most interesting shell-mounds hitherto discovered, is situated not far from the sea-coast, near Grenaa in north-east Jutland, in a beautiful beech-forest called "Aigt," or "Aglskov," on the property of M. Olsen, who, with a praiseworthy devotion to science, has given orders that the Kjökkenmödding should not be destroyed, although the materials of which it consists are well adapted for the improvement of the soil, and for other purposes, to which, indeed, they had already been in part applied before the true nature of the deposit was discovered. Arriving at his house, without invitation or notice, we were received by M. Olsen and his family with kindness and hospitality. M. Olsen immediately sent two workmen to clear away the rubbish which had fallen in since the last archæological visit, so that when we reached the spot we found a fresh wall of the shell-mound ready for examination. In the middle, this Kjökkenmödding has a thickness of about ten feet, from which, however, it slopes away in all direc-

tions; round the principal mound are several smaller ones, of the same nature. Over the shells a thin layer of mould has formed itself, on which the trees grow. A good section of such a Kjökkenmödding can hardly fail to strike with astonishment any one who sees it for the first time, and it is difficult to convey in words an exact idea of the appearance which it presents. The whole thickness consists of shells, oysters being at Meilgaard by far the most numerous, with here and there a few bones, and still more rarely stone implements or fragments of pottery. Excepting just at the top and bottom, the mass is quite unmixed with sand and gravel; and, in fact, contains *nothing* but what has been, in some way or other, subservient to the use of man. The only exceptions which I could see were a few, very few, rough flint pebbles, which were probably dredged up with the oysters. While we were in this neighbourhood, we visited another Kjökkenmödding at Fannerup on the Kolindsund, which was even in historical times an arm of the sea, but is now a fresh-water lake. Other similar deposits have been discovered on the Randersfjord and Mariagerfjord in this part of Jutland, nor are the two settlements at Havelse and Bilidt by any means the only ones on the Isefjord; in the neighbourhood of Roeskilde, Kjökkenmöddings occur near Gjerdrup, at Kattinge, and Kattinge Værk, near Trallerup, at Gjershöi, and opposite the island of Hyldeholme; besides several farther north, others have been found on the islands of Fyen, of Moen, and of Samsoe, and in Jutland along Liimfjord and Horsensfjord, as well as on the Mariagerfjord, Randersfjord, and Kolindsund. The southern parts of Denmark have not yet been carefully examined. Generally it is evident that deposits of this nature were scattered here and there over the whole coast, but that they were never formed inland. The whole country was more intersected by fjords during the Stone period even than it is now. Under these circum-

stances it is evident that a nation which subsisted principally on marine mollusca would never form any large inland settlements. In some instances, indeed, Kjökkenmöddings have been found as far as eight miles from the present coast, but in these cases there is good reason for supposing that the land has encroached on the sea. On the other hand, in those parts where Kjökkenmöddings do not occur, their absence is no doubt occasioned by the waves having to a certain extent eaten away the shore: an explanation which accounts for their being so much more frequent on the borders of the inland fjords than on the coast itself; and which seems to deprive us of all hope of finding any similar remains on our eastern and south-eastern shores. Shell-mounds, although probably belonging to a later date, have, however, actually been found on our coasts. They were observed by Dr. Gordon, of Birnie, on the shores of the Moray Firth. I have had the advantage of visiting these shell-mounds with him. The largest of the Scotch Kjökkenmöddings is on Loch Spynie. We did not find any implements or pottery in it, although we searched for several hours, but a labourer, who had been employed in carting it away for manure, had previously found some fragments of rude pottery and the bronze pin (fig. 171). Loch Spynie has been partially drained, and is shut out from the sea by a great accumulation of shingle, so that the water is now perfectly fresh. From ancient records it appears that the shingle barrier was probably completed, and the lake shut out from the sea, in the thirteenth and fourteenth centuries. On the other hand, I have submitted the bronze pin figured here to Mr. Franks, who gives it as his opinion that it is probably not older than 800 or 900 A.D. If, therefore, it really belongs to the shell-mound,

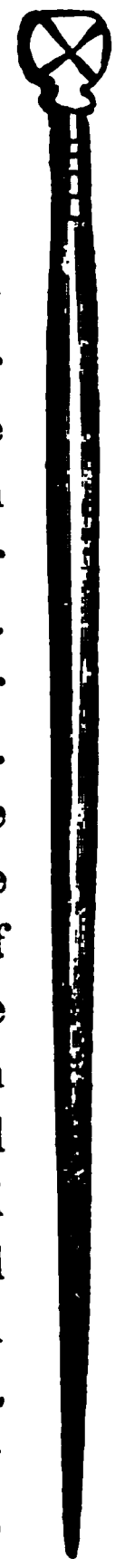


Fig. 171. Bronze pin from a Scotch Shell-mound.

and there seems no reason to doubt the statement of the man who found it, we thus get an approximate date for the accumulation of the mound itself. At St. Valéry, close to the mouth of the Somme, Mr. Evans, Mr. Prestwich, and I found a large accumulation of shells, from which I obtained several flint flakes and some pieces of rude pottery. Mr. Pengelly and Mr. Spence Bate have recently described some shell-mounds in Cornwall and Devonshire. Similar remains have been observed in various parts of the world, as, for instance, in Australia and Dampier *, in Tierra del Fuego by Mr. Darwin †, in the Malay Peninsula by Mr. Earle ‡, in the Andaman islands by Dr. Stoliczka §, and in both North ‖ and South ¶ America.

The fact that the majority of the Danish shell-mounds are found at a height of only a few feet above the sea appears to prove that there has been no considerable subsidence of the land since their formation, while, on the other hand, it clearly shows that there can have been no elevation. In certain cases, however, where the shore is steep, they have been found at a considerable height. It might indeed be supposed that where, as at Bilidt, the materials of the Kjökkenmödding were rudely interstratified with sand and gravel, the land must have sunk; but if for any length of time such a deposit was subjected to the action of the waves, all traces of it would be obliterated, and it is, therefore, probable that an explanation is rather to be found in the fact that the action of waves and storms may have been greater at that time than they are now. At present the tides only affect the Kattegat to the extent of about a foot and a half, and the configuration of the land protects it very much from the

* Pinkerton's Travels, vol. ii. p. 473.

† Journal, p. 234.

‡ Ethnological Soc. Trans., New Ser. vol. ii. p. 119.

§ Proc. As. Soc. Bengal, Jan. 1870.

‖ H. Wyman, The American Naturalist, vol. ii. Nos. 8, 9, and 11.

¶ Brett's Indian Tribes of Guiana.

action of the winds. On the other hand, the tides on the west coast of Jutland rise about nine feet, and the winds have been known to produce differences of level amounting to twenty-nine feet; and as we know that Jutland was anciently an archipelago, and that the Baltic was more open to the German Ocean than it is now, we can easily understand that the fluctuations of level may have been greater, and we can thus explain how the waves may have risen over the Kjökkenmödding at Bilidt (which is after all not much more than ten feet above the water), without resorting to the hypothesis of a subsidence and subsequent elevation of the coast.

In the Lake-habitations of the Stone Age in Switzerland, grains of wheat and barley, and even pieces of bread, or rather biscuit, have been found. It does not, however, appear that the men of the Kjökkenmöddings had any knowledge of agriculture, no traces of grain of any sort having been hitherto discovered. The only vegetable remains found in them have been burnt pieces of wood, and some charred substance, referred by M. Forchhammer to the *Zostera marina*, a sea-plant which was, perhaps, used in the production of salt.

The four species which are the most abundant in the shell-mounds are—

The oyster, *Ostrea edulis*, L.
The cockle, *Cardium edule*, L.
The mussel, *Mytilus edulis*, L. and
The periwinkle, *Littorina littorea*, L.

all four of which are still used as food for man. Other species occur more rarely, namely,—

Nassa reticulata, L.
Buccinum undatum, L.
Venus pullastra, Mont.
Helix nemoralis, Müll.

Venus aurea, Gm.
Trigonella plana, Da. C.
Littorina obtusata, L.
Helix strigella, Müll. and
Carocolla lapicida, L.

It is remarkable that the specimens of the first seven species are well developed, and decidedly larger than any now found in the neighbourhood. This is especially the case with the *Cardium edule* and *Littorina littorea*, while the oyster has entirely disappeared, and even in the Kattegat itself occurs only in a few places; a result which may, perhaps, be partly owing to the quantities caught by fishermen. Some oysters were, however, still living in the Isefjord at the beginning of this century, and their destruction cannot be altogether ascribed to the fishermen, as great numbers of dead shells are still present; but in this case it is attributed to the abundance of starfishes, which are very destructive to oysters. On the whole, their disappearance, especially when taken in connexion with the dwarf size of the other species, is evidently attributable in a great measure to the smaller proportion of salt in the water.

Of Crustacea only a few fragments of crabs have hitherto been found. The remains of vertebrata are very numerous and extremely interesting. In order to form an idea of the number of bones, and of the relative proportions belonging to different animals, Professor Steenstrup dug out from three different parts of the shell-mound at Havelse, square pillars with sides three feet in length, and carefully collected the bones therein contained. In the first pillar he found 175 bones of mammals, and 35 of birds; in the second pillar he found 121 of mammals and 9 of birds; in the third 309 of mammals and 10 of birds. The pillars, however, were not exactly comparable, because their cubic contents depended on the thickness of the shell-mound at the place where they

were taken, and varied between seventeen and twenty cubic feet. On the whole, Prof. Steenstrup estimates that there were from ten to twelve bones in each cubic foot. It will be seen, therefore, that the number of bones is very great. Indeed, from the mound at Havelse alone the Committee obtained in one summer 3500 bones of mammals, and more than 200 of birds, besides many hundred of fishes, which latter, indeed, are almost innumerable. The most common species are—

Clupea harengus, L. (the herring),
Gadus callarias, L. (the dorse),
Pleuronectes limanda, L. (the dab), and
Muræna anguilla, L. (the eel).

The remains of birds are highly interesting and instructive. The domestic fowl (*Gallus domesticus*) is entirely absent. The two domestic swallows of Denmark (*Hirundo rustica* and *H. urbica*), the sparrow and the stork are also missing. On the other hand, fine specimens of the capercailzie (*Tetrao urogallus*) which feeds principally on the buds of the pine, show that, as we know already from the remains found in the peat, the country was at one time covered with pine forests. Aquatic birds, however, are the most frequent, especially several species of ducks and geese. The wild swan (*Cygnus musicus*) which only visits Denmark in winter, is also frequently found; but, perhaps, the most interesting of the birds whose remains have been identified, is the Great Auk (*Alca impennis*, L.), a species which is now almost, if not altogether, extinct.

Of mammalia by far the most common are—

The stag (*Cervus elephas*, L.)
The roedeer (*Cervus capreolus*, L.) and
The wild boar (*Sus scrofa*, L.)

Indeed, Professor Steenstrup estimates that these three

species form ninety-seven per cent. of the whole; the others are—

The urus (*Bos urus*, L.)
The dog (*Canis familiaris*, L.)
The fox (*Canis vulpes*, L.)
The wolf (*Canis lupus*, L.)
The marten (*Martes sp.*)
The otter (*Lutra vulgaris*, Exl.)
The porpoise (*Delphinus phocæna*, L.)
The seal (*Phoca sp.*)
The water-rat (*Hypudæus amphibius*, L. and *Hypudæus agrestis*, L.)
The beaver (*Castor fiber*, L.)
The lynx (*Felis lynx*, L.)
The wild cat (*Felis catus*, L.)
The hedgehog (*Erinaceus europæus*, L.)
The bear (*Ursus arctos*, L.)
The mouse (*Mus flavicollis*, Mel.).

There are also traces of a smaller species of ox. The Lithuanian aurochs (*Bison europæus*) has been found, though rarely, in the peat bogs, but not yet in the Kjökkenmöddings. The musk ox (*Ovibos moschatus*) and the domestic ox (*Bos taurus*), as well as the reindeer, the elk, the hare, the sheep, and the domestic hog, are all absent*.

Professor Steenstrup does not believe that the domestic hog of ancient Europe was directly derived from the wild boar, but rather that it was introduced from the east; and the skulls which he showed me in support of this belief certainly exhibited very great differences between the two races. The sheep, the horse, and the reindeer are entirely absent, the domestic cat was not known in Europe until about the

* It is a curious fact that, as Prof. Steenstrup informs me, the bones from the Kjökkenmöddings of Jutland indicate, as a general rule, larger and more powerful animals than those of the Islands.

ninth century, and the bones of the urus are probably those of wild specimens, so that the dog* appears to have been the only domestic animal of the period; and though it may fairly be asked whether the bones may not have belonged to a race of wild dogs, the question admits of a satisfactory answer.

Among the remains of birds, the long bones which form about one fifth of the skeleton, are, in the Kjökkenmöddings, about twenty times as numerous as the others, and are almost always imperfect, the shaft only remaining. In the same manner it would be impossible to reconstruct a perfect skeleton of the quadrupeds, certain bones and parts of bones being always absent. In the case of the ox, for instance, the missing parts are the heads of the long bones (though while the shaft only of the femur is found, in the humerus one end is generally perfect), the back bone except the first two vertebræ, the spinous processes, and often the ribs, and the bones of the skull except the lower jaw and the portion round the eyes. It occurred to Prof. Steenstrup that these curious results might, perhaps, be referred to dogs; and, on trying the experiment, he ascertained that the bones which are absent from the Kjökkenmöddings are precisely those which dogs eat, and those which are present are the parts which are hard and solid and do not contain much nourishment. Prof. Steenstrup has since published a diagram of a skeleton, tinted in such a manner as to show at a glance which of the bones occur in the Kjökkenmöddings, and points out that it coincides exactly with one given by M. Flourens to illustrate those portions of the skeleton which are first formed. Although a glance at the longitudinal section of a long bone, as, for instance, of a femur, and a comparison of the open cancellated tissue of the two ends

* From the marks of knives on the bones, it seems evident that the dog was then, as it is still among several savage tribes, an article of food.

with the solid, close texture of the shaft, at once justifies and accounts for the selection made by the dogs, it is interesting thus to ascertain that their predilections were the same in primæval times as at present. Moreover, we may in this manner explain the prevalence of some bones in fossil strata. I have already mentioned that of the skull, the hard parts round the eye and the lower jaw are the only parts left; now the preponderance of *lower jaws* in a fossil state is well known.

For instance, in the "Proceedings of the Geological Society for 1857," p. 277, Dr. Falconer, after describing some of the fossils found by Mr. Beccles at Swanage, says:—"The curious fact that only lower jaws should have turned up among the Stonesfield mammalian remains has often been the subject of speculation or remark. The same, to a certain extent, has held good with the remains found in the Purbeck beds. . . . . In these minute creatures, unless the bone be complete, and, supposing it to be a long bone, with both its articular surfaces perfect, it is almost hopeless, or at any rate very discouraging, to attempt to make out the creature that yielded it; whereas the smallest fragment of a jaw, with a minute tooth in it, speaks volumes of evidence at the first glance. This I believe to be one great reason why we hear so much of jaw remains, and so little of other bones." No doubt it is so, but these observations, made by Prof. Steenstrup, afford a farther explanation of the fact, and it is to be regretted that the parts of the long bones which are most important to the palæontologist are also those which are preferred by beasts of prey.

In every case the bones which contained marrow are split open in the manner best adapted for its extraction; this peculiarity, which is in itself satisfactory proof of the presence of man, has not yet been observed in bones from the true tertiary strata.

The Kjökkenmöddings were not mere summer quarters; the ancient fishermen resided on these spots for at least two-thirds, if not the whole of the year. This we learn from an examination of the bones of the wild animals, as it is often possible to determine, within very narrow limits, the time of year at which they were killed. For instance, the remains of the wild swan (*Cygnus musicus*) are very common, and this bird is only a winter visitor, leaving the Danish coasts in March, and returning in November. It might naturally have been hoped that the remains of young birds would have supplied evidence as to the spring and early summer, but unfortunately, as has been already explained, no such bones are to be found. It is, therefore, fortunate that among the mammalia two periodical phenomena occur; namely, the shedding and reproduction of stags' antlers, which, with slight variations according to age, have a fixed season; and, secondly, the birth and growth of the young. These, and similar phenomena, render it highly probable that the "mound-builders" resided on the Danish coast all the year round, though I am disposed to think that, like the Fuegians, who lead, even now, a very similar life, they frequently moved from spot to spot. This appears to me to be indicated not only by the condition of the deserted hearths, but by the colour of the flint flakes, etc.; for while many of these retain the usual dull bluish black colour which is characteristic of newly-broken flints, and which remains unaltered as long as they are surrounded by carbonate of lime, others are whitened, as is usual with those which have been exposed for any length of time. Perhaps, therefore, these were lying on the surface during some period of desertion, and covered over only when the place was again inhabited.

The flint implements found in the Kjökkenmöddings resemble those which are characteristic of the "coastfinds." They may be classed as flakes (figs. 82–96); "Shell-mound"

axes, which, as we have already observed, present a peculiar

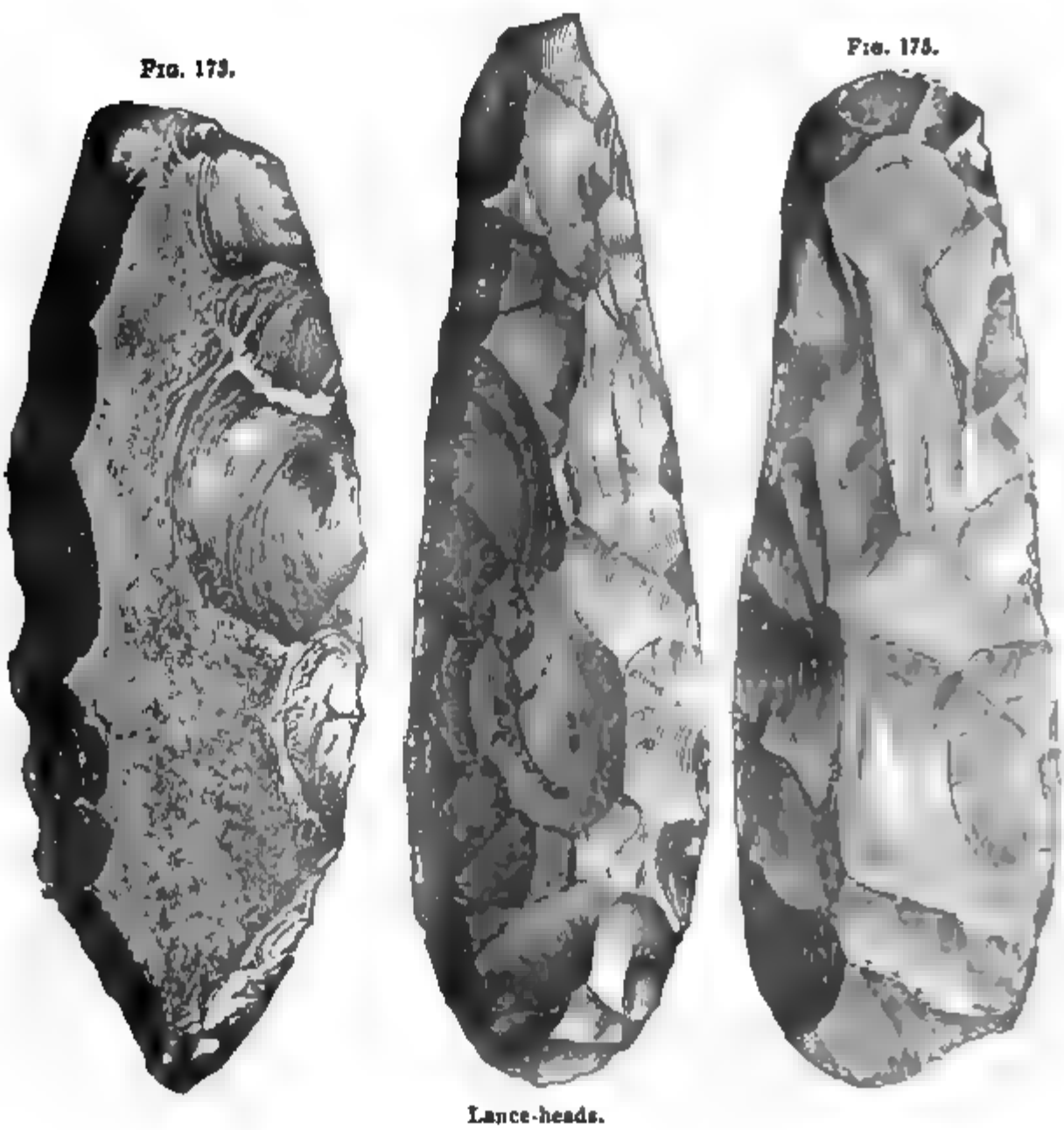
Fig. 172.

Awl.

Fig. 174.

Fig. 173.

Fig. 175.

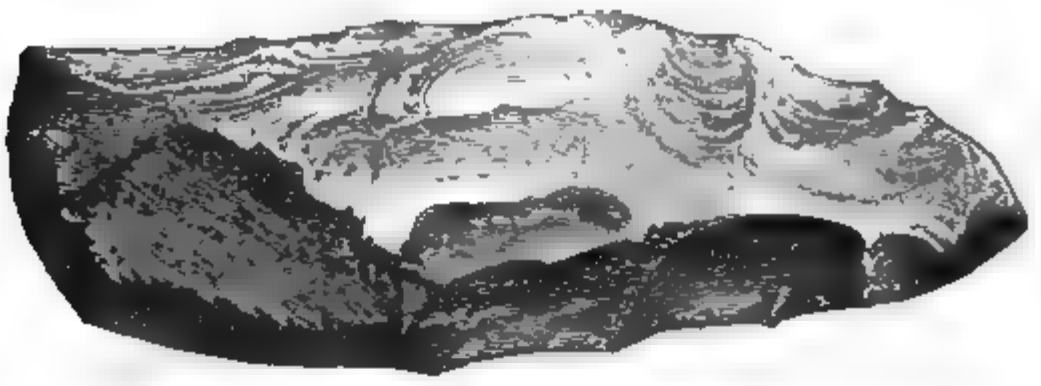


Lance-heads.

form (figs. 108–110, and pl. 1, figs. 8, 9), awls (fig. 172),

slingstones or net-weights (pl. 1, fig. 12), and rude lance-heads (figs. 173–175). With these occur other forms, which, though very rude, are evidently artificial, such as fig. 176, which appears to have been a kind of axe, and others of which the sharp edges were evidently used for cutting purposes.

Fig. 176.



Rude Flint Implement.

In the two days which we spent at Meilgaard, we found the following objects :—

"Shell-mound" axes	19	
Flint flakes	139	
Bone pins, etc.	6	
Horns	6	
Pottery, only	4	pieces
Stone hammer	1	
Slingstones, about	20	
	195	

Of the three "pillars" of material, just alluded to (p. 232), the first contained seven flint flakes, two axes, one worked piece of horn, three worked pieces of bone, and some pottery; in the second were sixteen flint flakes, one axe, and seven slingstones; in the third, four flint flakes, two flint axes, and a pointed bone. In short, without appearing to be richer than other Kjökkenmöddings, Meilgaard and Havelse have each produced already more than a thousand of these rude relics, though but a small portion of the mound has

in either case been hitherto removed. We need not, therefore, wonder at the number of axes found in the valley of the Somme, where so much larger a mass of material has been examined.

None of the large polished axes have yet been found in the Kjökkenmöddings: but a fragment of one, which was discovered at Havelse, and which had been worked up into a scraper, shows that they were not altogether unknown. A very few carefully formed weapons have been found, but the implements generally are very rude, and of the same types as those which have been already described as characteristic of the "Coastfinds." Small pieces of very coarse pottery have also been discovered, and many of the bones from the Kjökkenmöddings bear evident marks of a sharp instrument; several of the pieces found by us were in this condition, and had been fashioned into rude pins.

The observations of Arctic travellers prove that even if human bones had been found in the shell-mounds, this would not of itself be any evidence of cannibalism; but the absence of such remains satisfactorily shows that the primitive population of the North were free from this practice. On the other hand, the tumuli have supplied us with numerous skeletons which probably belong to the Stone Age. The skulls are very round, and in many respects resemble those of the Lapps, but have a more projecting ridge over the eye. One curious peculiarity is, that their front teeth did not overlap as ours do, but met one another, as do those of the Greenlanders of the present day. This evidently indicates a peculiar manner of eating.

Much as still remains to be made out respecting the men of the Stone period, the facts already ascertained, like a few strokes by a clever draughtsman, supply us with the elements of an outline sketch. Carrying our imagination back into the past, we see before us on the low shores of the Danish

Archipelago a race of small men, with heavy overhanging brows, round heads, and faces probably much like those of the present Laplanders. As they must evidently have had some protection from the weather, it is most probable that they lived in tents made of skins. The total absence of metal in the Kjökkenmöddings indicates that they had not yet any weapons except those made of wood, stone, horn, and bone. Their principal food must have consisted of shell-fish, but they were able to catch fish, and often varied their diet by game caught in hunting. It is, perhaps, not uncharitable to conclude that, when their hunters were unusually successful, the whole community gorged itself with food, as is the case with many savage races at the present time. It is evident that marrow was considered a great delicacy, for every single bone which contained any was split open in the manner best adapted to extract the precious morsel.

We have already seen that the mound-builders were regular settlers and not mere summer visitors; and on the whole they seem to have lived in very much the same manner as the Tierra del Fuegians, who dwell on the coast, feed principally on shell-fish, and have the dog as their only domestic animal. A very good account of them is given in Darwin's Journal (p. 234), from which I extract the following passages, which give us a vivid and probably correct idea of what might have been seen on the Danish shores, long, long ago. "The inhabitants, living chiefly upon shell-fish, are obliged constantly to change their place of residence; but they return at intervals to the same spots, as is evident from the pile of old shells, which must often amount to some tons in weight. These heaps can be distinguished at a long distance by the bright green colour of certain plants which invariably grow on them. . . . . The Fuegian wigwam resembles, in size and dimensions, a haycock. It merely consists of a few broken branches stuck in the ground, and

very imperfectly thatched on one side with a few tufts of grass and rushes. The whole cannot be so much as the work of an hour, and it is only used for a few days. . . . . At a subsequent period, the Beagle anchored for a couple of days under Wollaston Island, which is a short way to the northward. While going on shore, we pulled alongside a canoe with six Fuegians. These were the most abject and miserable creatures I any where beheld. On the east coast, the natives, as we have seen, have guanaco cloaks, and on the west, they possess sealskins. Amongst the central tribes the men generally possess an otter-skin, or some small scrap about as large as a pocket-handkerchief, which is barely sufficient to cover their backs as low down as their loins. It is laced across the breast by strings, and according as the wind blows, it is shifted from side to side. But these Fuegians in the canoe were quite naked, and even one full-grown woman was absolutely so. It was raining heavily, and the fresh water, together with the spray, trickled down her body. . . . . These poor wretches were stunted in their growth, their hideous faces bedaubed with white paint, their skins filthy and greasy, their hair entangled, their voices discordant, their gestures violent and without dignity. Viewing such men, one can hardly make oneself believe they are fellow-creatures and inhabitants of the same world. . . . At night, five or six human beings, naked, and scarcely protected from the wind and rain of this tempestuous climate, sleep on the wet ground coiled up like animals. Whenever it is low water, they must rise to pick shell-fish from the rocks; and the women, winter and summer, either dive to collect sea eggs, or sit patiently in their canoes, and, with a baited hair-line, jerk out small fish. If a seal is killed, or the floating carcase of a putrid whale discovered, it is a feast: such miserable food is assisted by a few tasteless berries and fungi. Nor are they exempt from famine, and,

as a consequence, cannibalism accompanied by parricide." In this latter respect, however, the advantage appears to be all on the side of the ancients, whom we have no right to accuse of cannibalism.

If the absence of cereal remains justifies us, as it appears to do, in concluding that they had no knowledge of agriculture, they must certainly have sometimes suffered from periods of great scarcity, indications of which may, perhaps, be seen in the bones of the fox, wolf, and other carnivora, which would hardly have been eaten from choice; on the other hand, they were blessed in the ignorance of spirituous liquors, and saved thereby from what is at present the greatest scourge of Northern Europe.

Prof. Worsaae has proposed to divide the Stone Age into two divisions, the first of which he again sub-divides. His classification stands as follows:—

The Older Stone Age.

1. The stone implements found in the drift, and in caves with remains of the mammoth, rhinoceros, hyæna, and other extinct animals.

2. The Kjökkenmöddings and Coastfinds.

The Later Stone Age.

Characterized by the beautifully worked stone implements and large tumuli.

The shell-mounds and coastfinds, according to Professor Worsaae, are characterized by very rough flint implements (figs. 108–10, 172–6) and are the remains of a much ruder and more barbarous people than that which constructed the large Stone Age tumuli, and made the beautiful weapons, etc., found in them. He does not altogether deny that a few well-worked implements, and fragments of such, have been found in the Kjökkenmöddings, but he considers that some of these at least may be altogether more recent than the

shell-mounds in which they are reported to have been found, and, at any rate, that their presence is altogether exceptional. At Meilgaard, for instance, the researches undertaken under the superintendence of the late king in June, 1861, produced more than five hundred flint flakes and other rude implements, but not a single specimen with a trace of polishing, or in any way resembling the flint implements found in the tumuli. On the other hand these rude implements are said to be wanting in the tumuli, where they are replaced by instruments of a different character and more skilful workmanship. Moreover, while it is admitted on all hands that the shell-mound makers had no domestic animal but the dog, and no knowledge of agriculture, Prof. Worsaae considers that during the later Stone Age, the inhabitants of Denmark certainly possessed tame cattle and horse and had in all probability some knowledge of agriculture.

Prof. Steenstrup is of an entirely different opinion, and considers that the Kjökkenmöddings and Stone Age tumuli were contemporaneous. He denies altogether that remains of tame oxen or horses have been found in tumuli of the Stone Age, except in very few instances, and in these he maintains that the fragments which have occurred are evidently not coeval with the mounds themselves, and that in all probability they have been introduced by foxes. He admits that the stone implements from the shell-mounds and coastfinds are altogether different from, and much ruder than, those from the tumuli; he considers the two classes as representing, not two different degrees, but two different phases of one single condition of civilization. The tumuli are the burial places of chiefs, the Kjökkenmöddings are the refuse heaps of fishermen. The first contain all that skill could contrive, affection offer, or wealth command; the second, those things only which art could not make available, which were thrown away as useless, or accidentally lost. In order,

therefore, to compare these two classes of objects, we must take,—not the ordinary rude specimens which are so numerous in the shell-mounds, but the few better made implements which, fortunately for science and for us, were lost among the oyster-shells, or which had been broken, and therefore thrown away. These, though few in number, are, in Professor Steenstrup's opinion quite as numerous as could have been expected under the circumstances. Moreover, the long flint flakes, which are so common in the Kjökkenmöddings, are sufficient evidence that great skill in the treatment of flint had already been attained. Indeed, as Professor Steenstrup has pointed out, we are apt, in consequence of their simplicity, and the small number of blows required in forming these flakes, to underrate the skill required for their manufacture. Any one, however, who will try to make some for himself, while he will probably be very unsuccessful, will at least learn a valuable lesson in the appreciation of flint implements. Some of the flakes found in the Kjökkenmöddings are equal to any from the tumuli; several of those which we found at Meilgaard were more than five, and one was more than six, inches in length, while I have in my possession a giant flake from Fannerup (figs. 82-84), given to me by Professor Steenstrup, which has a length of eight inches and three quarters. As regards the rude, more or less triangular "axes" (figs. 108–10) which are so characteristic of the Kjökkenmöddings and coastfinds, Prof. Steenstrup, as we have already seen, declines to compare them with the polished axes of the tumuli, because in his opinion they were not intended for the same purposes. In addition to the direct evidence derived from the discovery of some few well-made flint axes of the tumulus type, Professor Steenstrup relies much on the indirect evidence derivable from the other contents of the shell-mounds. Thus the frequent remains of large and full-grown animals, for instance of the seal, and the wild

ox, are in his opinion sufficient evidence that the shell-mound builders must have had weapons more useful and destructive than any which Prof. Worsaae will concede to them; moreover, he considers that many of the cuts which are so common on the bones found in the shell-heaps must have been made by polished implements, and are too smooth to be the marks of flint flakes, according to the suggestion of Professor Worsaae. Finally, Professor Steenstrup, though not attributing so much weight as Professor Worsaae to the absence of the ruder implements from the tumuli, even if this had been the case, disputes the fact on the ground that these implements would not until recently have been recognized and collected, and that they have, in fact, been found whenever they were looked for.

After having carefully considered the evidence on both sides, I find myself, as might naturally be expected, unable altogether to agree with either.

The small rude axes seem to me even less well adapted to the purpose suggested by Prof. Steenstrup, than for those which have generally been attributed to them. There are, no doubt, some which could never have been used for cutting, but these may have been failures, owing to some want of skill on the part of the manufacturer, or some flaw in the flint itself. Others appear to me, as to Prof. Worsaae, serviceable, though rude; and well adapted for some purpose (possibly for oyster dredging or chopping wood), which required a strong, rather than a sharp edge. They also very closely resemble in form some of the adzes used by the South Sea Islanders, one of which I have figured for comparison (see pp. 98, 99). They seem to me, however, as to Prof. Steenstrup, to differ in character from the well-made and generally polished axes, and not to be ruder implements of the same type. Although the carefully formed knives, axes, lance-heads, etc., would not be likely to abound in the Kjökkenmöddings, any

more than works of art, or objects of value, in modern dust-heaps; still I confess I should have expected that fragments of these instruments, recognizable to us, though useless to their original owners, would have been more numerous than, in reality, they appear to be.

In addition to the five hundred rude implements, described by Prof. Worsaae, as having been found at Meilgaard during the king's visit, I myself obtained a hundred and forty flint flakes, with about fifty other implements, in the visit to this celebrated locality which I made last year under the guidance of Prof. Steenstrup. To these, again, must be added many which had previously been collected by M. Olsen, and the members of the Kjökkenmödding committee; and yet among so large a number of instruments of various kinds there is only one which in any respect resembles the well-worked implements of the tumuli. So, again, at Havelse only a single fragment of a polished axe has been found among more than a thousand objects of the ruder kind. It might, however, fairly be urged that in such a comparison, neither the flakes nor "slingstones" ought to be brought into consideration; in this case, and if we were to count the axes only, the numbers would be greatly diminished.

There is also much weight in Prof. Steenstrup's argument derived from the flint flakes, and he has not at all exaggerated the skill shown in their manufacture. Their edges, however, are so sharp that it would, I cannot help thinking, be very difficult to distinguish a cut produced by a flake, from one made by a ground axe. On the other hand, the alleged absence of rude implements in the Stone Age barrows has been satisfactorily explained by Professor Steenstrup. In this country it might be argued from the statements of so intelligent an antiquary as Sir R. Colt Hoare, that rude implements were never, or very rarely, found in tumuli, but the more recent researches of Mr. Bateman, Mr. Greenwell,

and other archæologists, have shown that this is very far from being the case, and have made it evident that the ruder implements of stone were overlooked by the earlier archæologists. In the tumuli examined by Mr. Bateman, he obtained many flint flakes, etc., quite as rude as those which are found in the shell-mounds. So far as I am aware, however, none of the small triangular axes, which are so characteristic of the shell-mounds, have yet been met with in the tumuli. Nor, on the other hand, has a single specimen resembling those which are characteristic of the Palæolithic Age, yet been found in the shell-mounds.

Finally, as regards the supposed remains of domestic animals (other than the dog) in Stone Age tumuli, the evidence brought forward by Professor Worsaae seems to me inconclusive, which, however, is of the less consequence, as the point will certainly be determined ere long, now that attention has specially been directed to it.

On the whole, the evidence appears to show that the Danish shell-mounds represent a definite period in the history of that country, and are probably referable to the early part of the Neolithic Stone Age, when the art of polishing flint implements was known, but before it had reached its greatest development.

It is, however, as yet, impossible to affix even an approximate date in years to the formation of the Kjökkenmöddings. Their accumulation, indeed, must evidently have occupied a considerable period, and it is of course highly probable that some are much older than others. They must all, however, be of very considerable antiquity. We know that the country has long been covered by beech forests, and yet it appears that during the Bronze Age beeches were absent, or only represented by stragglers, while the whole country was covered with oaks. This change implies a great lapse of time, even if we suppose that but a few generations of

oaks succeeded one another. We know also that the oaks had been preceded by pines, and that the country was inhabited even then.

Again, the immense number of objects belonging to the Bronze Age, which have been already found in Denmark, and the great number of tumuli, appear to justify the Danish archæologists in assigning to this period a great lapse of time. This argument applies with peculiar force to the remains of the Stone period; for a country, the inhabitants of which live by hunting and fishing, can never be thickly populated; and, on the whole, the conclusion is forced upon us, that the country must have been inhabited for a lengthened period, although none of the Danish remains yet discovered belong to a time as ancient as some of those which have been found in other parts of Europe, and which will be described in subsequent chapters.

CHAPTER VIII.

NORTH AMERICAN ARCHÆOLOGY.

OUR knowledge of North American Archæology is derived mainly from the valuable researches of Mr. Caleb Atwater, contained in the first volume of the Archæologia Americana, and from four excellent memoirs published under the auspices of the Smithsonian Institution:—1. Ancient Monuments of the Mississippi Valley, comprising the Results of extensive Original Surveys and Explorations, by E. G. Squier, A.M., and E. H. Davis, M.D. 2. Aboriginal Monuments of the State of New York, comprising the Results of Original Surveys and Explorations, with an illustrative Appendix; by E. G. Squier, A.M. 3. The Antiquities of Wisconsin, as surveyed and described by J. A. Lapham. 4. The Archæology of the United States, or Sketches, Historical and Biographical, of the Progress of Information and Opinion respecting Vestiges of Antiquity in the United States; by Samuel F. Haven. Nor must I omit to mention Schoolcraft's History, Condition, and Prospects of the Indian Tribes of the United States.

The memoir by Messrs. Squier and Davis, occupying more than three hundred pages, is chiefly descriptive of ancient fortifications, enclosures, temples, and mounds, and of the different implements, ornaments, etc., which have been obtained from them. It is embellished with forty-eight plates, and two hundred and seven woodcuts.

In his second work, Mr. Squier confines himself to the antiquities of the State of New York. Within these limits, however, he describes many ancient monuments of various kinds, and he feels "warranted in estimating the number which originally existed in the State at from two hundred to two hundred and fifty." He comes to the conclusion, "little anticipated," he says, "when I started on my trip of exploration," that the earthworks of Western New York were erected by the Iroquois, or their western neighbours, and do not possess any very great antiquity.

The systematic exploration of the ancient remains in the State of Wisconsin, described in the memoir by Mr. Lapham, was undertaken on behalf of the American Antiquarian Society, by which the necessary funds were provided. The cost of the publication, however, which from the great number of engravings (fifty-five plates, besides sixty-one wood engravings) was considerable, was defrayed by the Smithsonian Institution, and the work is included in the seventh volume of "Contributions."

Mr. Haven's work is well described in the title, and forms an interesting introduction to the study of North American Archæology. He gives us comparatively few observations or opinions of his own; but after a careful examination of what others have written, he comes to the conclusion that the ancient earthworks of the United States "differ less in kind than in degree from other remains concerning which history has not been entirely silent. They are more numerous, more concentrated, and in some particulars on a larger scale of labour, than the works which approach them on their several borders, and with whose various characters they are blended. Their numbers may be the result of frequent changes of residence by a comparatively limited population, in accordance with a superstitious trait of the Indian nature, leading to the abandonment of places where any great calamity has

been suffered; but they appear rather to indicate a country thickly inhabited for a period long enough to admit of the progressive enlargement and extension of its movements."

Although Mr. Schoolcraft's work is more especially devoted to the present, or recent, condition and habits of the Indian tribes, still he gives us much archæological information, and I shall have occasion frequently to quote from his elaborate work.

The antiquities themselves fall into two great divisions: Implements (including ornaments) and Earthworks. The earthworks have been again divided by the American Archæologists into seven classes:—1. Defensive enclosures; 2. Sacred and miscellaneous enclosures; 3. Sepulchral mounds; 4. Sacrificial mounds; 5. Temple mounds; 6. "Animal" mounds; and 7. Miscellaneous mounds. These classes I shall treat separately, and we can then better consider the "mound-builders" themselves.

The simple weapons of bone and stone, found in America, closely resemble those which occur in other countries. The flakes, hatchets, axes, arrow-heads, and bone implements are, for instance, very similar to those which occur in the Swiss Lakes, if only we make allowance for the differences of material. In addition to the simple forms, which may almost be said to be ubiquitous, there are some, however, which are more complicated. In many cases they are perforated, as for instance those figured by Messrs. Squier and Davis*. The perforated axes found in Europe are generally considered to belong to the Metallic Age; but as far as America is concerned, we have not yet any evidence as to the relative antiquity of the perforated and imperforated types.

At the time of the discovery of America, iron was abso-

* Ancient Monuments of the Mississippi Valley. By E. S. Squier and E. H. Davis.

lutely unknown to the natives, with the exception, perhaps, of a tribe near the mouth of the La Plata, who had arrows tipped with this metal, which they are supposed to have obtained from masses of native iron. The powerful nations of Central America were, however, in an age of Bronze, while the North Americans were in a condition of which we find in Europe but scanty traces—namely, in an age of Copper. Silver is the only other metal which has been found in the ancient tumuli, and that but in very small quantities. It occurs sparingly in a native form with the copper of Lake Superior, whence, in all probability, it was derived. It does not appear to have been ever smelted. From the large quantity of galena which is found in the mounds, Messrs. Squier and Davis are disposed to think that lead must have been used to a certain extent by the North American tribes: the metal itself, however, has not, I believe, yet been found.

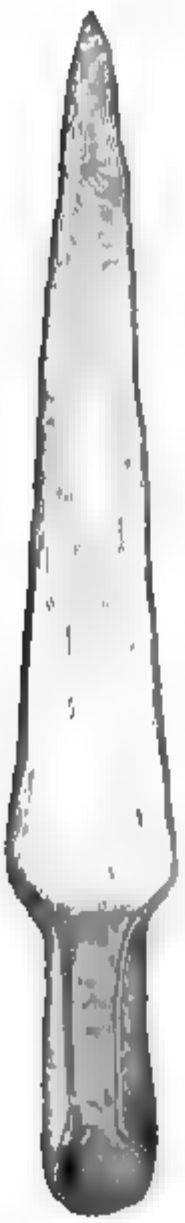
FIG. 177.

Copper Arrowhead.

Copper, on the other hand, both wrought and unwrought, occurs frequently in the tumuli. It is interesting to observe that the copper arrow- or spear-heads (fig. 177) resemble the American type of stone arrow-heads. The axes have a striking resemblance to those simple European forms, which contain the minimum quantity of tin, and as in them the socket, when there is one, is made by flattening the copper and turning over the edge (fig. 178); and some of the Mexican paintings give us interesting evidence as to the manner in which they were handled and used. These, however, were of bronze, and had, therefore, been fused; but the Indian axes, which are of pure metallic copper, appear in all cases to have been worked in a cold state, which is remarkable, because, as Messrs. Squier and

Davis have pointed out, "the fires upon the altar were sufficiently intense to melt down the copper implements and ornaments deposited upon them. The hint thus afforded does not seem to have been seized upon*." This is the more surprising, because, as Schoolcraft† tells us, "in almost all the works lately opened, there are heaps of coals and ashes, showing that fire had much to do with their operations." Thus, though they were acquainted with metal, they did not know how to use it; and as Professor Dana has well observed in a letter with which he has favoured me, they may in one sense be said to have been in an age of Stone, since they used the copper, not as metal, but as Stone. This intermediate condition between an age of Stone and one of metal is most interesting.

FIG. 178.



Copper Spear-head.

In the neighbourhood of Lake Superior, and in some other still more northern localities, copper is found native in large quantities, and the Indians had therefore nothing to do but to break off pieces and hammer them into the required shape. Hearne's celebrated journey to the mouth of the Coppermine River, under the auspices of the Hudson's Bay Company, was undertaken in order to examine the locality whence the natives of that district obtained the metal. In this case it occurred in lumps actually on the surface, and the Indians seem to have picked up what they could, without attempting any thing that could be called mining. Round Lake Superior, however, the case is very different. A short account of the ancient copper-mines is given by Messrs.

* One "cast" copper axe is recorded as having been found in the State of New York, but there is no evidence to show by whom it was made.

† Indian Tribes, p. 97.

Squier and Davis in the work already so often cited, by Mr. Squier in "The Aboriginal Monuments of the State of New York," by Mr. Lapham *, and by Mr. Schoolcraft †, while the same subject is treated at considerable length by Professor Wilson. The works appear to have been first discovered in 1847 by the agent of the Minnesota Mining Company.

"Following up the indications of a continuous depression in the soil, he came at length to a cavern where he found several porcupines had fixed their quarters for hybernation; but detecting evidences of artificial excavation, he proceeded to clear out the accumulated soil, and not only exposed to view a vein of copper, but found in the rubbish numerous stone mauls and hammers of the ancient workmen. Subsequent observations brought to light ancient excavations of great extent, frequently from twenty-five to thirty feet deep, and scattered over an area of several miles. The rubbish taken from these is piled up in mounds alongside; while the trenches have been gradually refilled with the soil and decaying vegetable matter gathered through the long centuries since their desertion; and over all, the giants of the forest have grown, and withered, and fallen to decay. Mr. Knapp, the agent of the Minnesota Mining Company, counted three hundred and ninety-five annular rings on a hemlock-tree, which grew on one of the mounds of earth thrown out of an ancient mine. Mr. Foster also notes the great size and age of a pine stump, which must have grown, flourished, and died since the works were deserted; and Mr. C. Whittesley not only refers to living trees now flourishing in the gathered soil of the abandoned trenches, upwards of three hundred years old, but adds, 'On the same spot there are the decayed trunks of a preceding generation or generations of trees that have arrived at maturity, and fallen down from old age.'

* l. c. p. 74. † l. c. p. 95.

According to the same writer, in a communication made to the American Association, at the Montreal meeting in 1857, these ancient works extend over a tract from 100 to 150 miles in length, along the southern shore of the lake."

In another excavation was found a detached mass of native copper, weighing upwards of six tons. It rested on an artificial cradle of black oak, partly preserved by immersion in water. Various implements and tools of the same metal were found with it. The commonest of these are the stone mauls or hammers, of which from one place ten cart-loads were obtained. With these were "stone axes of large size, made of greenstone, and shaped to receive withe-handles. Some large round greenstone masses, that had apparently been used for sledges, were also found. They had round holes bored in them to a depth of several inches, which seemed to have been designed for wooden plugs, to which withe-handles might be attached, so that several men could swing them with sufficient force to break the rock and the projecting masses of copper. Some of them were broken, and some of the projecting ends of rock exhibited marks of having been battered in the manner here suggested*."

Wooden implements are so perishable that we could not expect many of them to have been found. Two or three wooden bowls, a trough, and some shovels with long handles, are all that appear to be recorded.

It has often been stated that the Indians possessed some method, at present unknown, by which they were enabled to harden the copper. This, however, from examinations instituted by Professor Wilson, seems to be an error. Some copper implements, which he submitted to Professor Crofts, were found to be no harder than the native copper from Lake Superior. "The structure of the metal was also highly laminated, as if the instrument had been brought

* Prof. W. W. Mather in a letter to Mr. Squier, l. c. p. 184.

to its present shape by hammering out a solid mass of copper."

Before the introduction of metallic vessels, the art of the potter was more important even than it is at present. Accordingly, the sites of all ancient habitations are generally marked by numerous fragments of pottery: this is as true of the ancient Indian settlements, as of the Celtic towns of England, or the lake villages of Switzerland. These fragments, however, would generally be those of rude household vessels, and it is principally from the tumuli that we obtain those better-made urns and cups from which the state of the art may fairly be inferred. Yet very few indeed of the British sepulchral urns, belonging to ante-Roman times, have upon them any curved lines. Representations of animals or plants are also almost entirely wanting. They are even absent from all articles belonging to the Bronze Age in Switzerland, and I might almost say in Western Europe generally, while ornaments of curved and spiral lines are eminently characteristic of this period. The ornamental ideas of the Stone Age, on the other hand, are confined, so far as we know, to compositions of straight lines, and the idea of a curve scarcely seems to have occurred to them. The most elegant ornaments on their vases are impressions made by the finger-nail, or by a cord wound round the soft clay.

Dr. Wilson has well pointed out, that, as regards Europe, "in no single case is any attempt made to imitate leaf or flower, bird, beast, or any simple natural object; and when, in the bronze work of the later Iron period, imitative forms at length appear, they are chiefly the snake and dragon shapes and patterns, borrowed seemingly by Celtic and Teutonic wanderers, with the wild fancies of their mythology, from the far Eastern cradle-land of their birth."

Very different was the condition of American Art. "The art of pottery attained to a considerable degree of perfection."

Some of the vases found in the tumuli are said to rival, "in elegance of model, delicacy, and finish," the best Peruvian specimens. The material used is a fine clay: in the more delicate specimens, pure; in the coarser ones, mixed with pounded quartz. The art of glazing and the use of the potter's wheel appear not to have been known, though that "simple approximation to a potter's wheel may have existed," which consists of "a stick of wood grasped in the hand by the middle, and turned round inside a wall of clay formed by the other hand, or by another workman*."

Among the most characteristic specimens of ancient American pottery are the pipes. Some of these are simple bowls, smaller indeed, but otherwise not unlike a common every-day pipe, from which they differ, however, in having generally no stem, the mouth having apparently been applied direct to the bowl. Many are highly ornamented, others are spirited representations of monsters or of animals, such as the beaver, otter, wild cat, elk, bear, wolf, panther, raccoon, opossum, squirrel, manatee, eagle, hawk, heron, owl, buzzard, raven, swallow, parroquet, duck, grouse, and many others. The most interesting of these, perhaps, is the Manatee or Lamantin, of which seven representations have been found in the mounds of Ohio. These are no mere rude sculptures, about which there might easily be a mistake, but "the truncated head, thick semicircular snout, peculiar nostrils, tumid, furrowed upper lip, singular feet or fins, and remarkable moustaches, are all distinctly marked, and render the recognition of the animal complete†." This curious animal is not at present found nearer than the shores of Florida, a thousand miles away.

The ornaments which have been found in the mounds consist of beads, shells, necklaces, pendants, plates of mica, bracelets, gorgets, etc. The number of beads is sometimes

* Squier and Davis, l. c. p. 195. † Squier and Davis, l. c. p. 252.

quite surprising. Thus the celebrated Grave Creek mound contained between three and four thousand shell-beads, besides about two hundred and fifty ornaments of mica, several bracelets of copper, and various articles carved in stone. The beads are generally made of shell, but are sometimes cut out of bone or teeth; in form they are generally round or oblong; sometimes the shell of the Unio is cut and strung so as to "exhibit the convex surface and pearly nacre of the shell." The necklaces are often made of beads or shells, but sometimes of teeth. The ornaments of mica are thin plates of various forms, each of which has a small hole. The bracelets are of copper, and generally encircle the arms of the skeletons, besides being frequent on the "altars." They are simple rings "hammered out with more or less skill, and so bent that the ends approach, or lap over, each other." The so-called "gorgets" are thin plates of copper, always with two holes, and probably therefore worn as badges of authority.

The earthworks are most abundant in the central parts of the United States. They decrease in number as we approach the Atlantic, and are very scarce in British America and on the west of the Rocky Mountains.

The works belonging to this class "usually occupy strong natural positions," and as a fair specimen of them we may take the Bourneville Enclosure in Ross County, Ohio. "This work," say Messrs. Squier and Davis (l.c. p. 11), "occupies the summit of a lofty detached hill, twelve miles westward from the city of Chillicothe, near the village of Bourneville. The hill is not far from four hundred feet in perpendicular height; and is remarkable, even among the steep hills of the west, for the general abruptness of its sides, which at some points are absolutely inaccessible. . . . . The defences consist of a wall of stone, which is carried round the hill a little below the brow; but at some places it rises, so as to cut off

the narrow spurs, and extends across the neck that connects the hill with the range beyond." It must not, however, be understood that any thing like a true wall now exists; the present appearance is rather what might have been "expected from the falling outwards of a wall of stones, placed, as this was, upon the declivity of a hill." Where it is most distinct it is from fifteen to twenty feet wide, by three or four in height. The area thus enclosed is about one hundred and forty acres, and the wall is two miles and a quarter in length. The stones themselves vary much in size, and Messrs. Squier and Davis suggest that the wall may originally have been about eight feet high, with an equal base. At present, trees of the largest size are growing upon it. On a similar work known as "Fort Hill," Highland County, Ohio, Messrs. Squier and Davis found a splendid chestnut tree, which they suppose to be six hundred years old. "If," they say, "to this we add the probable period intervening from the time of the building of this work to its abandonment, and the subsequent period up to its invasion by the forest, we are led irresistibly to the conclusion that it has an antiquity of at least one thousand years. But when we notice, all around us, the crumbling trunks of trees, half hidden in the accumulating soil, we are induced to fix on an antiquity still more remote."

The enclosure known as "Clark's Work," in Ross County, Ohio, is one of the largest and most interesting. It consists of a parallelogram, two thousand eight hundred feet by eighteen hundred, and enclosing about one hundred and eleven acres. To the right of this, the principal work is a *perfect square*, containing an area of about sixteen acres. Each side is eight hundred and fifty feet in length, and in the middle of each is a gateway thirty feet wide, covered by a small mound. Within the area of the great work are several smaller mounds and enclosures; and it is estimated

that not less than three millions of cubic feet of earth were used in this great undertaking. Yet from the peculiarly mottled character of the earth forming these mounds, it would appear to have been brought in bags or small parcels*. It has also been observed that water is almost invariably found within, or close to these enclosures.

It is remarkable that there is not a single case in which counter-works occur near any of the ancient North American fortifications. Col. Whittlesey† draws from this fact the conclusion that the period during which the mound-builders turned "their attention to military affairs was probably short, and, when their preparations were made, they may have withdrawn farther south without a vigorous defence." I should rather infer that the warfare of the mound-builders, like that of the more modern Red Indians, consisted not of persevering sieges, but of sudden attacks and surprises.

If the purpose for which the works belonging to the first class were erected is very evident, the same cannot be said for those which we have now to mention. That they were not intended for defence is inferred by Messrs. Squier and Davis from their small size, from the ditch being inside the embankment, and from their position, which is often completely commanded by neighbouring heights.

Dr. Wilson also (vol. i. p. 324) follows Sir R. C. Hoare in considering the position of the ditch as being a distinguishing mark between military and religious works. But Catlin expressly tells us that in a Mandan village, which he describes, the ditch was on the inner side of the embankment, and the warriors were thus sheltered while they shot their arrows through the stockade. We see, therefore, that in America at least, this is no reliable guide.

While, however, the defensive earthworks occupy hill tops,

* Whittlesey, On the Weapons and Character of the Mound-builders. Mem. Boston Soc. of Nat. Hist., vol. i. pt. iv. p. 473. † l. c. p. 479.

and other situations most easy to defend, the so-called sacred enclosures are generally found on "the broad and level river bottoms, seldom occurring upon the table-lands or where the surface of the ground is undulating or broken." They are usually square or circular in form; a circular enclosure being often combined with one or two squares. Occasionally they are isolated, but more frequently in groups. The greater number of the circles are of small size, with a nearly uniform diameter of two hundred and fifty or three hundred feet, and the ditch is invariably inside the wall. Some of the circles, however, are much larger, enclosing fifty acres or more. The squares or other rectangular works never have a ditch, and the earth of which they are composed appears to have been taken up evenly from the surface, or from large pits in the neighbourhood. They vary much in size; five or six of them, however, are "exact squares, each side measuring one thousand and eighty feet—a coincidence which could not possibly be accidental, and which must possess some significance." The circles also, in spite of their great size, are so nearly round, that the American archæologists consider themselves justified in concluding that the mound-builders must have had some standard of measurement, and some means of determining angles.

The most remarkable group is that near Newark, in the Scioto Valley, which covers an area of *four square miles!* A plan of these gigantic works is given by Messrs. Squier and Davis, and another, from a later survey, by Mr. Wilson. They consist of an octagon, with an area of fifty, a square occupying twenty acres, and two large circles occupying respectively thirty and twenty acres. From the octagon an avenue formed by parallel walls extends southwards for two miles and a half; there are two other avenues which are rather more than a mile in length, one of them connecting the octagon with the square.

Besides these, there are various other embankments and small circles, the greater number about eighty feet in diameter, but some few much larger. The walls of these small circles, as well as those of the avenues and of the irregular portions of the works generally, are very slight, and for the most part about four feet in height. The other embankments are much more considerable; the walls of the large circle are even now twelve feet high, with a base of fifty feet, and an interior ditch seven feet deep and thirty-five in width. At the gateway, however, they are still more imposing; the walls being sixteen feet high, and the ditch thirteen feet deep. The whole area is covered with "gigantic trees of a primitive forest;" and, say Messrs. Squier and Davis, "in entering the ancient avenue for the first time, the visitor does not fail to experience a sensation of awe, such as he might feel in passing the portals of an Egyptian temple, or gazing upon the silent ruins of Petra of the desert."

The city of Circleville takes its name from one of these embankments, which, however, is no more remarkable than many others. It consists of a square and a circle, touching one another; the sides of the square being about nine hundred feet in length, and the circle a little more than a thousand feet in diameter. The square had eight doorways, one at each angle, and one in the middle of each side, every doorway being protected by a mound. The circle was peculiar in having a double embankment. This work, alas! has been entirely destroyed; and many others have also disappeared, or are being gradually obliterated by the plough. Under these circumstances, we read with pleasure that "The Directors of the Ohio Land Company, when they took possession of the country at the mouth of the Muskingum River, in 1788, adopted immediate measures for the preservation of these monuments. To their credit be it said, one of their

earliest official acts was the passage of a resolution, which is entered upon the Journal of their proceedings, reserving the two truncated pyramids and the great mound, with a few acres attached to each, as public squares." Such enlightened conduct deserves the thanks of archæologists, and I sincerely hope that the Company has prospered.

Both as being the only example of an enclosure yet observed in Wisconsin, and also as having in many respects a great resemblance to a fortified town, the ruins of Aztalan are well worthy of attention. They are situated on the west branch of Rock River, and were discovered in 1836 by N. F. Hyer, Esq., who surveyed them hastily, and published a brief description, with a figure, in the "Milwaukie Advertiser." In "Silliman's American Journal," No. XLIV., is a paper on the subject by Mr. Taylor, from which was derived the plan and the short account given by Messrs. Squier and Davis*. The most complete description is contained in Mr. Lapham's "Antiquities of Wisconsin†." The name "Aztalan" was given to this place by Mr. Hyer, because the Aztecs had a tradition that they originally came from a country to the north, which they called Aztalan. It is said to be derived from two Mexican words, Atl, water, and An, near. "The main feature of these works is an enclosure of earth (not brick, as has been erroneously stated), extending around three sides of an irregular parallelogram;" the river "forming the fourth side on the east. The space thus enclosed contains seventeen acres and two-thirds. The corners are not rectangular, and the embankment or ridge is not straight." "The ridge forming the enclosure is 631 feet long at the north end, 1419 feet long on the west side, and 700 feet on the south side; making a total length of wall of 2750 feet. The ridge or wall is about 22 feet wide, and from one foot to five in height. The wall of earth is enlarged on

* l. c. p. 131. † p. 41.

the outside, at nearly regular distances, by mounds of the same material. They are called buttresses, or bastions; but it is quite clear that they were never intended for either" the one or the other. They vary from sixty-one to ninety-five feet apart, the mean distance being eighty-two feet. Near the south-west angle are two outworks, constructed in the same manner as the main embankment.

In many places the earth forming the walls appears to have been burnt. "Irregular masses of hard reddish clay, full of cavities, bear distinct impressions of straw, or rather wild hay, with which they had been mixed before burning." "This is the only foundation for calling these 'brick walls.' The 'bricks' were never made into any regular form, and it is even doubtful whether the burning did not take place in the wall after it was built." These walls must therefore present some faint resemblance to the celebrated vitrified forts of Scotland, and to fortifications of a similar character which have recently been observed in France and Germany. Some of the mounds or buttresses, though forming part of an enclosure, were also used for sepulchral purposes, as was proved by their containing skeletons in a sitting posture, with fragments of pottery. The highest point inside the enclosure is at the south-west corner, and is "occupied by a square truncated mound, which . . . . presents the appearance of a pyramid, rising by successive steps like the gigantic structures of Mexico." "At the north-west angle of the enclosure is another rectangular, truncated, pyramidal elevation, of sixty-five feet level area at the top, with remains of its graded way, or sloping ascent, at the south-west corner, leading also towards a ridge that extends in the direction of the river."

Within the enclosure are some ridges about two feet high, and connected with them are several rings, or circles, which are supposed to be the remains of mud houses. "Nearly the

whole interior of the enclosure appears to have been either excavated or thrown up into mounds and ridges; the pits and irregular excavations being quite numerous over much of the space not occupied by mounds." These excavations and ridges are, in all probability, the ruins of houses. Some years ago a skeleton was found in one of the mounds, wrapped apparently in cloth of open texture, "like the coarsest linen fabric;" but the threads were so rotten as to make it quite uncertain of what material they were made.

The last Indian occupants of this interesting locality had no tradition as to the history or the purpose of these earthworks.

Among the Northern tribes of existing Indians there do not appear to be any earthworks corresponding to these so-called Sacred Enclosures. "No sooner, however, do we pass to the southward, and arrive among the Creeks, Natchez, and affiliated Floridian tribes, than we discover traces of structures which, if they do not entirely correspond with the regular earthworks of the West, nevertheless seem to be somewhat analogous to them*." These tribes, indeed, appear to have been more civilized than those of the North, since they were agricultural in their habits, lived in considerable towns, and had a systematized religion, so that, in fact, they must have occupied a position intermediate, as well economically as geographically, between the powerful monarchies of Central America and the hunting tribes of the North. The "structures" to which Mr. Squier alludes are described by him, both in his "Second Memoir," and also in the "Ancient Monuments of the Mississippi Valley" (p. 120). The "Chunk Yards," now or lately in use among the Creeks, and which have only recently been abandoned among the Cherokees, are rectangular areas, generally occupying the centre of the town, closed at the sides, but with an opening at each end. They are sometimes from six to nine hundred

* Squier, l. c. p. 136.

feet in length, being largest in the older towns. The area is levelled and slightly sunk, being surrounded by a low bank formed of the earth thus obtained. In the centre is a low mound, on which stands the Chunk Pole, to the top of which is some object which serves as a mark to shoot at. Near each corner at one end, is a small pole, about twelve feet high; these are called the "slave posts," because in the "good old times," captives condemned to the torture were fastened to them. The name "Chunk Yard" seems to be derived from an Indian game called "Chunke," which was played in them. At one end of, and just outside, this area stands generally a circular eminence, with a flat top, upon which is elevated the Great Council House. At the other end is a flat-topped, square eminence, about as high as the circular one just mentioned; "upon this stands the public square."

These, and other accounts given by early travellers among the Indians, certainly throw much light on the circular and square enclosures; some of which, though classed by Messrs. Squier and Davis under this head, seem to me to be the slight fortifications which surrounded villages, and were undoubtedly crowned by stockades. We have already seen that the position of the ditch is in reality no argument against this view; nor does the position of the works seem conclusive, if we suppose that they were intended less to stand a regular siege than to guard against a sudden attack.

The *Sepulchral* mounds are very numerous in the central parts of the United States. "To say that they are innumerable in the ordinary sense of the term, would be no exaggeration. They may literally be numbered by thousands and tens of thousands." They vary from six to eight feet in height; generally stand outside the enclosures; are often isolated, but often also in groups; they are usually round, but sometimes elliptical or pear-shaped. They cover generally a single skeleton, which, however, is often burnt. Oc-

casionally there is a stone cist, but urn burial also prevailed to a considerable extent, especially in the Southern States. The corpse was generally buried in a contracted position. Implements both of stone and metal occur frequently; but while personal ornaments, such as bracelets, perforated plates of copper, beads of bone, shell or metal, and similar objects, are very common, weapons are but rarely found; a fact which, in the opinion of Dr. Wilson, "indicates a totally different condition of society and mode of thought" from those of the present Indian.

Certain small tumuli found in America have been regarded as the remains of mud huts. Mr. Dille* has examined and described some small tumuli observed by him in Missouri. He dug into several, but never succeeded in finding any thing except coal, char, and a few pieces of pottery, whence he concluded that they were the remains of mud houses †. The Mandans, Minatarees, and some other tribes, even until quite lately, built their huts of earth, resting on a framework of wood.

On the other hand, there are some tumuli to which it would seem that this explanation is quite inapplicable, and which are full of human remains. This was long supposed to be the case with the great Grave Creek Mound, which indeed was positively stated by Atwater ‡, to be full of human remains. This has turned out to be an error, but the statement is not the less true as regards other mounds. In conjunction with them may be mentioned the "bone pits," many of which are described by Mr. Squier §. "One of these pits, discovered some years ago in the town of Cambria, Niagara County, was estimated to contain the bones of several thousand individuals. Another which I visited in the

* Smithsonian Contributions, vol. i. p. 136.

† Archæologia Americana, vol. i. p. 223.

‡ See also Lapham, l. c. p. 80.

§ l. c. pp. 25. 56, 57. 68. 71. 73. 106, 107. Squier and Davis, l. c. p. 118, etc.

town of Clarence, Erie County, contained not less than four hundred skeletons." A tumulus described by Mr. Jefferson in his "Notes on Virginia," was estimated to contain the skeletons of a thousand individuals, but in this case the number was perhaps exaggerated.

The description given by various old writers of the solemn "Festival of the Dead" satisfactorily explains these large collections of bones. It seems that every eight or ten years the Indians used to meet at some place previously chosen, that they dug up their dead, collected the bones together, and laid them in one common burial place, depositing with them fine skins and other valuable articles. Several of these ossuaries are described by Schoolcraft*.

The so-called "Sacrificial Mounds," are, says Dr. Wilson, "a class of ancient monuments, altogether peculiar to the New World, and highly illustrative of the rites and customs of the ancient races of the mounds. This remarkable class of mound has been very carefully explored, and their most noticeable characteristics are, their almost invariable occurrence within enclosures; their regular construction in uniform layers of gravel, earth, and sand, disposed alternately in strata conformable to the shape of the mound; and their covering, a symmetrical altar of burnt clay or stone, on which are deposited numerous relics, in all instances exhibiting traces, more or less abundant, of their having been exposed to the action of fire." The so-called "altar" is a basin, or table of burnt clay, carefully moulded into a symmetrical form, but varying much both in shape and size. Some are round, some elliptical, and others squares or parallelograms, while in size they vary from two feet to fifty feet by twelve or fifteen. The usual dimensions, however, are from five to eight feet. They are almost always found within sacred enclosures. Of the whole number

* l. c. p. 102.

examined by Messrs. Squier and Davis there were only four which were exterior to the walls of enclosures, and these were but a few rods distant from them.

The "altar" is always on a level with the natural soil, and bears traces of long continued heat; in one instance, where it appears to have been formed of sand, instead of clay, the sand for a depth of two inches is discoloured, as if fatty matter of some sort had been burnt on it. In this case a second deposit of sand had been placed on the first, and upon this stones a little larger than a hen's egg were arranged, so as to form a pavement, which strongly reminds us of the ancient hearths in the Danish Kjökkenmöddings.

In a few instances traces of timber were found above the altar. Thus in one of the twenty-six tumuli forming the "Mound City" on the Scioto River were a number of pieces of timber, four or five feet long, and six or eight inches thick. "These pieces had been of nearly uniform length; and this circumstance, joined to the position in which they occurred in respect to each other and to the altar, would almost justify the inference that they had supported some funeral or sacrificial pile*." The contents of these mounds vary very much. The one just mentioned contained a quantity of pottery and many implements of stone and copper, all of which had been subjected to a strong heat. The pottery may have formed a dozen vessels of moderate size. The copper articles consisted of two chisels, and about twenty thin strips. About fifty or a hundred stone arrow-heads, some flakes, and two carved pipes, completed the list of articles found in this interesting tumulus. In another mound nearly two hundred pipes were buried. Generally speaking, the deposit is homogeneous: "that is to say, instead of finding a large variety of relics, ornaments, weapons, and other articles, such as go to make up the pos-

* Squier and Davis, l. c. p. 151.

sessions of a barbarian dignitary, we find upon one altar *pipes* only, upon another a single mass of galena, while the next one has a quantity of pottery, or a collection of spear-heads, or else is destitute of remains, except perhaps a thin layer of carbonaceous material. Such could not possibly be the case upon the above hypothesis, for the spear, the arrows, the pipe, and the other implements, and personal ornaments of the dead, would then be found in connexion with each other*."

This conclusion does not seem altogether satisfactory; and, although these altar-containing mounds differ in so many respects from the above-described tumuli, I still feel disposed to regard them as sepulchral rather than sacrificial. Not having, however, had the advantage of examining them for myself, I throw this out as a suggestion, rather than express it as an opinion. It is difficult to understand why "altars" should be covered up in this manner; I can call to mind no analogous case. On the other hand, if Professor Nilsson's suggestion with reference to ancient tumuli be correct, the long continued fire will offer no difficulty. Among the Buraets, for instance, the hearth is made of beaten earth, on which a good fire is kept blazing at all times†. Such a house, if used finally as a sepulchre, would present an altar very much like those above described; while the wooden constructions and the burnt bones will all be explicable on the hypothesis that we have before us a sepulchre, rather than a temple.

Nor does the "homogeneousness" of the deposits found in these mounds appear so decisive to me as to Messrs. Squier and Davis. Take, for instance, the cases in which pipes are found. The execution of these is so good that "pipe-carving" was no doubt a profession; the division of labour must have already begun. Exactly the same feeling which induces many savage races to bury weapons with the dead hunter,

* Squier and Davis, p. 160. † Ernan, l. c. vol. ii. p. 408.

in order that he may supply himself with food in Hades as on earth; that feeling, which among some ancient nations suggested the placing of money in the grave, would account not only for the presence of these pipes, but also for their number. The hunter could use but few weapons, and must depend for success mainly on his strength and skill; whereas the pipe-seller, if he could dispose of a pipe at all in the grave, might render his whole stock-in-trade available.

I have already mentioned the great number of objects found in the Grave Creek Mound, which was undoubtedly sepulchral, and in which one of the skeletons was accompanied by seventeen hundred bone beads, five hundred sea-shells, and one hundred and fifty pieces of mica, besides other objects. Many flakes, arrow-heads, etc., have been at times found in tumuli, so that the mere number of objects seems no argument against the sepulchral nature of these so-called "sacrificial mounds."

If, therefore, "the accumulated carbonaceous matter, like that formed by the ashes of leaves or grass," which suggests to Professor Wilson "the graceful offerings of the first-fruits of the earth, so consonant to the milder forms of ancient sacrifice instituted in recognition of the Lord of the Harvest," seems to me only the framework of the house, or the material of the funeral pyre; on the other hand, I avoid the conclusion to which he is driven, that on "the altars of the mound-builders, human sacrifices were made; and that within their sacred enclosures were practised rites not less hideous than those which characterized the worship which the ferocious Aztecs are affirmed to have regarded as most acceptable to their sanguinary gods."

Another class of mounds, called by Messrs. Squier and Davis "Temple Mounds," "are pyramidal structures, truncated, and generally having graded avenues to their tops. In some instances they are terraced, or have successive

stages. But whatever their form, whether round, oval, octangular, square, or oblong, they have invariably flat or level tops, of greater or lesser area." These mounds much resemble the Teocallis of Mexico, and had probably a similar origin. They are rare in the North, though examples occur even as far as Lake Superior, but become more and more numerous as we pass down the Mississippi, and especially on approaching the Gulf, where they constitute the most numerous and important portion of the ancient remains. Some of the largest, however, are situated in the North. One of the most remarkable is at Cahokia, in Illinois. This gigantic mound is stated to be *seven hundred* feet long, *five hundred* feet wide at the base, and *ninety* feet in height. Its solid contents have been roughly estimated at twenty millions of cubic feet.

Probably, however, these mounds were not used as temples only, but also as sites for dwellings, especially for those of the chiefs. We are told that among the Natchez Indians "the temples and the dwellings of the chiefs were raised upon mounds, and for every new chief a new mound and dwelling were constructed." Again, Garcilasso de la Vega, in his history of Florida, quoted by Mr. Haven*, says, "The town and house of the Cacique of Osachile are similar to those of all other caciques in Florida, and, therefore, it seems best to give one description that will apply generally to all the capitals, and all the houses of the chiefs in Florida. I say, then, that the Indians endeavour to place their towns upon elevated places; but because such situations are rare in Florida, or that they find a difficulty in procuring suitable materials for building, they raise eminences in this manner. They choose a place, to which they bring a quantity of earth, which they elevate into a kind of platform two or three pikes in height (from eighteen to

* l. c. p. 57.

twenty-five feet), of which the flat top is capable of holding ten or twelve, fifteen or twenty houses, to lodge the cacique, his family, and suite*."

Not the least remarkable of the American antiquities are the *Animal Mounds*, which are principally, though not exclusively, found in Wisconsin. In this district "thousands of examples occur of gigantic basso-relievos of men, beasts, birds, and reptiles, all wrought with persevering labour on the surface of the soil," while enclosures and works of defence are almost entirely wanting, the "ancient city of Aztalan" being, as is supposed, the only example of the former class.

The "Animal Mounds" were discovered by Mr. Lapham in 1836, and described in the newspapers of the day, but the first account of them in any scientific journal was that by Mr. R. C. Taylor, in the American Journal of Science and Art, for April, 1838. In 1843 a longer memoir, by Mr. S. Taylor, appeared in the same journal. Professor J. Locke gave some account of them in a "Report on the Mineral Lands of the United States," presented to Congress in 1840. Messrs. Squier and Davis devoted to the same subject a part of their work on the "Ancient Monuments of the Mississippi Valley;" and, finally, the seventh volume of the Smithsonian Contributions contains the work, by Mr. Lapham, which gives the most complete account of these interesting remains.

Mr. Lapham adds a map, showing the distribution of these curious earthworks. They appear to be most numerous in the southern counties of Wisconsin; and extend from the Mississippi to Lake Michigan, following generally the course of the river, and being especially numerous along the great Indian trail, or war-path, from Lake Michigan, near Milwaukie, to the Mississippi, above the Prairie du Chien. This, however, does not prove any connexion between the present

* See also Schoolcraft, l. c. vol. iii. p. 47.

Indians and the mounds; the same line has been adopted as the route of the United States' military road, and may have been in use for an indefinite period.

The mounds themselves not only represent animals, such as men, buffaloes, elks, bears, otters, wolves, raccoons, birds, serpents, lizards, turtles, and frogs, but also some inanimate objects, if at least the American archæologists are right in regarding some of them as crosses, tobacco-pipes, etc.

Many of the representations are spirited and correct, but others, probably through the action of time, are less definite; one, for instance, near the village of Muscoda, may be either "a bird, a bow and arrow, or the human figure." Their height varies from one to four feet, sometimes, however, rising to six feet, and as a "regular elevation of six inches can be readily traced upon the level prairies" of the West, their outlines are generally distinctly defined where they occupy favourable positions. It seems probable that many of the details have disappeared under the action of rain and vegetation. At present a "man" consists generally of a head and body, two long arms, and two short legs, no other details being visible. The "birds" differ from the "men" principally in the absence of legs. The so-called "lizards," which are among the most common forms, have a head, two legs, and a long tail; the side view being represented, as is, indeed, the case with most of the quadrupeds.

One remarkable group in Dale County, close to the Great Indian War-path, consists of a man with extended arms, seven more or less elongated mounds, one tumulus and six quadrupeds. The length of the human figure is one hundred and twenty-five feet, and it is one hundred and forty feet from the extremity of one arm to that of the other. The quadrupeds vary from ninety to a hundred and twenty-six feet in length.

At Waukesha are a number of mounds, tumuli, and animals,

including several "lizards," a very fine "bird," and a magnificent "turtle." "This, when first observed, was a very fine specimen of the art of mound-building, with its graceful curves, the feet projecting back and forward, and the tail, with its gradual slope, so acutely pointed, that it was impossible to ascertain precisely where it terminated. The body was fifty-six feet in length, and the tail two hundred and fifty; the height six feet." This group of mounds is now, alas, covered with buildings: "A dwelling-house stands on the body of the turtle, and a Catholic church is built upon the tail."

"But," says Mr. Lapham, "the most remarkable collection of lizards and turtles yet discovered is on the school section, about a mile and a half south-east from the village of Pewaukee. This consists of seven turtles, two lizards, four oblong mounds, and one of the remarkable excavations before alluded to. One of the turtle mounds, partially obliterated by the road, has a length of four hundred and fifty feet, being nearly double the usual dimensions. Three of them are remarkable for their curved tails, a feature here first observed."

In several places a very curious variation occurs. The animals, with the usual form and size, are represented, not in relief, but intaglio; not by a mound, but by an excavation.

The few "Animal Mounds" which have been observed out of Wisconsin differ in many respects from the ordinary type. Near Granville, in Ohio, on a high spur of land, is an earthwork, known in the neighbourhood as the "Alligator." It has a head and body, four sprawling legs, and a curled tail. The total length is two hundred and fifty feet; the breadth of the body forty feet, and the length of the legs thirty-six feet. "The head, shoulders, and rump are more elevated than the other parts of the body, an attempt having evidently been made to preserve the proportions of the object copied."

The average height is four feet, at the shoulders six. Even more remarkable is the great serpent in Adams County, Ohio. It is situated on a high spur of land, which rises a hundred and fifty feet above Brush Creek. "Conforming to the curve of the hill, and occupying its very summit, is the serpent, its head resting near the point, and its body winding back for seven hundred feet, in graceful undulations, terminating in a triple coil at the tail. The entire length, if extended, would be not less than one thousand feet. The accompanying plan, laid down from accurate survey, can alone give an adequate conception of the outline of the work, which is clearly and boldly defined, the embankment being upwards of five feet in height, by thirty feet base at the centre of the body, but diminishing somewhat toward the head and tail. The neck of the serpent is stretched out, and slightly curved, and its mouth is opened wide, as if in the act of swallowing or ejecting an oval figure, which rests partially within the distended jaws. This oval is formed by an embankment of earth, without any perceptible opening, four feet in height, and is perfectly regular in outline, its transverse and conjugate diameters being one hundred and sixty, and eighty feet respectively."

When, why, or by whom these remarkable works were erected, as yet we know not. The present Indians, though they look upon them with reverence, can throw no light upon their origin. Nor do the contents of the mounds themselves assist us in this inquiry. Several of them have been opened, and, in making the streets of Milwaukie, many of the mounds have been entirely removed; but the only result has been to show that they are not sepulchral, and that, excepting by accident, they contain no implements or ornaments.

Under these circumstances speculation would be useless; we can but wait, and hope that time and perseverance may

solve the problem, and explain the nature of these remarkable and mysterious monuments.

There is one class of objects which I have not yet mentioned, and which yet ought not to be left entirely unnoticed.

The most remarkable of these is the celebrated Dighton Rock, on the east bank of the Taunton River. Its history, and the various conclusions which have been derived from it, are very amusingly given by Dr. Wilson*. In 1783, the Rev. Ezra Stiles, D.D., President of Yale College, when preaching before the Governor of the State of Connecticut, appealed to this rock, inscribed, as he believed, with Phœnician characters, for a proof that the Indians were descended from Canaan, and were therefore accursed. Count de Gebelin regarded the inscription as Carthaginian. In the eighth volume of the "Archæologia," Colonel Vallency endeavours to prove that it is Siberian; while certain Danish antiquaries regard it as Runic, and thought that they could read the name "Thorfinn," "with an exact, though by no means so manifest, enumeration of the associates who, according to the Saga, accompanied Karlsefne's expedition to Vinland, in A.D. 1007." Finally, Mr. Schoolcraft submitted a copy of it to Chingwauk, an intelligent Indian chief, who "interpreted it as the record of an Indian triumph over some rival native tribe," but without offering any opinion as to its antiquity.

In the "Grave Creek Mound" was found a small oval disk of white sandstone, on which were engraved twenty-two letters. Mr. Schoolcraft, who has especially studied this relic, finally concludes, after corresponding with many American and European Archæologists, according to Dr. Wilson †, that of these twenty-two letters, four corresponded "with ancient Greek, four with the Etruscan, five with the old Northern Runes, six with the ancient Gaelic, seven with the old Erse,

* Pre-historic Man, vol. ii. p. 172. † Ibid. p. 180.

ten with the Phœnician, fourteen with the Anglo-Saxon, and sixteen with the Celtiberic; besides which possibly equivalents may be found in the old Hebrew. It thus appears that this ingenious little stone is even more accommodating than the Dighton Rock, in adapting itself to all conceivable theories of ante-Columbian colonization." A stone of such doubtful character could prove little under any circumstances; but it must also be mentioned that "Dr. James W. Clemens communicated to Dr. Morton all the details of the exploration of the Grave Creek Mound; . . . . without any reference to the discovery of the inscribed stone. Nor was it till the excavated vault had been fitted up by its proprietor for exhibition, to all who cared to pay for the privilege of admission, that the marvellous inscription opportunely came to light, to add to the attractions of the show."

One or two other equally doubtful cases are upon record, but upon the whole we may safely assert that there is no reason to suppose that the nations of America had developed for themselves any thing corresponding to an alphabet. The art of picture-writing, which they shared with the Aztecs and the Quipa of the Peruvians, was supplemented among the North American Indians by the "wampum." This curious substitute for writing consisted of variously-coloured beads, generally worked upon leather. One very interesting example is the belt of wampum "delivered by the Lenni Lenape Sachems to the founder of Pennsylvania, at the Great Treaty, under the elm-tree at Shachamox in 1682." It is still preserved in the collection of the Historical Society at Philadelphia, and consists of "eighteen strings of wampum formed of white and violet beads worked upon leather thongs," the whole forming a belt twenty-eight inches long, and two-and-a-half broad. "On this five patterns are worked in violet beads on a white ground, and in the centre Penn is represented taking the hand of the Indian Sachem." The numerous

beads found in some of the tumuli were perhaps in a similar manner intended to commemorate the actions and virtues of the dead.

Just as the wigwam of the recent Mandan consisted of an outer layer of earth supported on a wooden framework, so also, in the ancient sepulchral tumuli, the body was protected only by beams and planks; when therefore these latter decayed, the earth sank in and crushed the skeleton within. Partly from this cause, and partly from the habit of burying in ancient tumuli, which makes it sometimes difficult to distinguish the primary from secondary interments, it happens that from so many thousand tumuli we have very few well-preserved skulls which indisputably belong to the ancient race. These are decidedly brachycephalic; but it is evident that we must not attempt to build much upon so slight a basis.

No proof of a knowledge of letters, no trace of a burnt brick, have yet been discovered; and so far as we may judge from their arms, ornaments, and pottery, the mound-builders closely resembled some at least of the recent Indian tribes, and the earthworks agree in form with, if they differ in magnitude from, those still, or until lately, in use. Yet this very magnitude is sufficient to show that, at some early period, the great river valleys of the United States must have been more densely populated than they were when first discovered by Europeans. The immense number of small earthworks, and the mounds, "which may be counted by thousands and tens of thousands," might indeed be supposed to indicate either a long time or a great population; but in other cases we have no such alternative. The Newark constructions; the mound near Florence in Alabama, which is forty-five feet in height by four hundred and forty feet in circumference at the base, with a level area at the summit of one hundred and fifty feet in circumference; the still greater mound on the Etowah

river, also in Alabama, which has a height of more than seventy-five feet, with a circumference of twelve hundred feet at the base, and one hundred and forty at the summit; the embankments at the mouth of the Scioto river, which are estimated to be twenty miles in length; the great mound at Selserstown, Mississippi, which covers six acres of ground; and the truncated pyramid at Cahokia, to which we have already alluded; these works and many others which might have been quoted, indicate a population both large and stationary; for which hunting cannot have supplied enough food, as it has been estimated that in a forest country each hunter requires an area of not less than 50,000 acres for his support; and which must, therefore, have derived its support, in a great measure, from agriculture. "There is not," say Messrs. Squier and Davis, "and there was not in the sixteenth century, a single tribe of Indians (north of the semi-civilized nations) between the Atlantic and the Pacific, which had means of subsistence sufficient to enable them to apply, for such purposes, the unproductive labour necessary for the work; nor was there any in such a social state as to compel the labour of the people to be thus applied." We know also that many, if not most of the Indian tribes, at that time still cultivated the ground to a certain extent, and there is some evidence that, even within historic times, this was more the case than at present. Thus De Nonville estimates the amount of Indian corn destroyed by him in four Seneca villages at 1,200,000 quarters.

Mr. Lapham* has brought forward some ingenious reasons for thinking that the forests of Wisconsin were at no very distant period much less general than at present. In the first place, the largest trees are probably not more than five hundred years old; and large tracts are now covered with "young trees, where there are no traces of antecedent

* l. c. p. 90.

growth." Every year many trees are blown down, and frequent storms pass through the forest, throwing down nearly every thing before them. Mr. Lapham gives a map of these windfalls in one district; they are very conspicuous, firstly, because the trees, having a certain quantity of earth entangled among their roots, continue to vegetate for several years; and, secondly, because even when the trees themselves have died and rotted away, the earth so torn up forms little mounds, which are often mistaken by the inexperienced for Indian graves. "From the paucity of these little 'tree-mounds,' we infer that no very great antiquity can be assigned to the dense forests of Wisconsin, for during a long period of time, with no material change of climate, we would expect to find great numbers of these little monuments of ancient storms scattered every where over the ground."

But there is other more direct evidence of ancient agriculture. In many places the ground is covered with small mammillary elevations, which are known as Indian corn-hills. "They are without order of arrangement, being scattered over the ground with the greatest irregularity. That these hillocks were formed in the manner indicated by their name, is inferred from the present custom of the Indians. The corn is planted in the same spot each successive year, and the soil is gradually brought up to the size of a little hill by the annual additions *." But Mr. Lapham has also found traces of an earlier and more systematic cultivation. These consist "of low, parallel ridges, as if corn had been planted in drills. They average four feet in width, twenty-five of them having been counted in the space of a hundred feet; and the depth of the walk between them is about six inches.

* Lapham, l. c. p. 19. See also Cheney, "On Ancient Monuments in Western New York:" in the 13th Report of the Regents of the University of the State of New York, 1860, p. 40.

These appearances, which are here denominated 'ancient garden-beds,' indicate an earlier and more perfect system of cultivation than that which now prevails; for the present Indians do not appear to possess the ideas of taste and order necessary to enable them to arrange objects in consecutive rows. Traces of this kind of cultivation, though not very abundant, are found in several other parts of the State (Wisconsin). The garden-beds are of various sizes, covering, generally, from twenty to one hundred acres. Some of them are reported to embrace even three hundred acres. As a general fact, they exist in the richest soil, as it is found in the prairies and bun oak plains. In the latter case, trees of the largest kind are scattered over them."

In the "Ancient Monuments of the Mississippi Valley" it is stated that no earthwork has ever been found on the first or lowest terrace of any of the great rivers, and that "this observation is confirmed by all who have given attention to the subject." If true, this would, indeed, have indicated a great antiquity, but in his subsequent work Mr. Squier informs us that "they occur indiscriminately upon the first and upon the superior terraces, as also upon the islands of the lakes and rivers." Messrs. Squier and Davis* are of opinion that the decayed state of the skeletons found in the mounds may enable us to form "some approximate estimate of their remote antiquity," especially when we consider that the earth round them "is wonderfully compact and dry, and that the conditions for their preservation are exceedingly favourable." "In the barrows of the ancient Britons," they add, "entire well-preserved skeletons are found, although possessing an undoubted antiquity of at least eighteen hundred years." Dr. Wilson† also relies much on this fact, which, in his opinion, "furnishes a stronger evidence of their great antiquity than any of the proofs that have been derived either

* l. c. p. 168.

† l. c. vol. i. p. 359.

from the age of a subsequent forest growth, or the changes wrought on the river terraces where they most abound." It is true that the bones in Stone Age graves are often extremely well preserved; but it is equally true that those in Saxon barrows have in many cases entirely perished. In fact, the condition of ancient bones depends so much on the circumstances in which they have been placed, that we must not attribute much importance to this argument.

The evidence derived from the forests is more reliable. Thus Captain Peck * observed near the Ontonagon river, and at a depth of twenty-five feet, some stone mauls and other implements in contact with a vein of copper. Above these was the fallen trunk of a large cedar, and "over all grew a hemlock-tree, the roots of which spread entirely above the fallen tree" . . . . . and indicated, in his estimation, a growth of not less than three centuries, to which must then be added the age of the cedar, which indicates a still "longer succession of centuries, subsequent to that protracted period during which the deserted trench was slowly filled up with accumulations of many winters."

The late President Harrison, in an address to the Historical Society of Ohio, made some very interesting remarks on this subject, which are quoted by Messrs. Squier and Davis †. "The process," he says, "by which nature restores the forest to its original state, after being once cleared, is extremely slow. The rich lands of the west are, indeed, soon covered again, but the character of the growth is entirely different, and continues so for a long period. In several places upon the Ohio, and upon the farm which I occupy, clearings were made in the first settlement of the country, and subsequently abandoned and suffered to grow up. Some of these new forests are now sure of fifty years' growth, but they have made so little progress towards attaining the appearance of

* Wilson, l. c. vol. i. p. 256.

† l. c. p. 306.

the immediately contiguous forest, as to induce any man of reflection to determine that at least ten times fifty years must elapse before their complete assimilation be effected. We find in the ancient works all that variety of trees which give such unrivalled beauty to our forests, in natural proportions. The first growth of the same kind of land, once cleared and then abandoned to nature, on the contrary, is nearly homogeneous, often stinted to one or two, at most three kinds of timber. If the ground has been cultivated, the yellow locust will quickly spring up; if not cultivated, the black and white walnut will be the prevailing growth. . . . . Of what immense age, then, must be the works so often referred to, covered as they are by at least the second growth, after the primitive forest state was regained* ?"

We obtain another indication of antiquity in the "garden-beds," which we have already described. This system of cultivation has long been replaced by the irregular "cornhills;" and yet, according to Mr. Lapham†, the garden-beds are much more recent than some of the mounds, across which they sometimes extend in the same manner as over the adjoining grounds. If, therefore, these mounds belong to the same area as those which are covered with wood, we get thus indications of three periods; the first that of the mounds themselves; the second, that of the garden-beds; and the third, that of the forests.

But American agriculture was not imported from abroad; it resulted from, and in return rendered possible, the gradual development of American semi-civilization. This is proved by the fact, that the grains of the Old World were entirely absent, and that American agriculture was founded on the maize, an American plant. Thus, therefore, we appear to have indications of four long periods.

1. That in which, from an original barbarism, the Ameri-

* See also Arch. Amer., vol. i. p. 306. † l. c. p. 19.

can tribes developed a knowledge of agriculture and a power of combination.

2. That in which for the first time mounds were erected, and other great works undertaken.

3. The age of the "garden-beds," which occupy some at least of the mounds. Hence it is probable that these particular "garden-beds" were not in use until after the mounds had lost their sacred character in the eyes of the occupants of the soil; for it can hardly be supposed that works executed with so much care would be thus desecrated by their builders.

4. The period in which man relapsed into partial barbarism, and the spots which had been first forest, then, perhaps, sacred monuments, and thirdly, cultivated ground, relapsed into forest once more.

But even if we attribute to these changes all the importance which has ever been claimed for them, they will not require an antiquity of more than three thousand years. I do not, of course, deny that the period may have been very much greater, but, in my opinion at least, it *need* not be greater. At the same time there are other observations, which if they shall eventually prove to be correct, would indicate a very much higher antiquity.

One of these is an account* by Dr. A. C. Koch of a mastodon found in Gasconade County, Missouri, which had apparently been stoned to death by the Indians, and then partially consumed by fire. The fire, he says, was evidently "not an accidental one, but, on the contrary, it had been kindled by human agency, and, according to all appearance, with the design of killing the huge creature, which had been found mired in the mud and in an entirely helpless condition.

. . . . . .

* Trans. of the Academy of Science of St. Louis, 1857, p. 61.

I found, also, among the ashes, bones and rocks, several arrow-heads, a stone spear-head, and some stone axes."

In a second case the same writer assures us that he found several stone arrow-heads mingled with the bones of a mastodon. "One of the arrow-heads lay underneath the thigh-bone of the skeleton, the bone actually resting in contact upon it; so that it could not have been brought thither after the deposit of the bone; a fact which I was careful thoroughly to investigate." These statements, however, have not generally been accepted by geologists.

In the valley of the Mississippi, Dr. Dickeson, of Natchez, found the *os innominatum* of a man with some bones of the *Mastodon ohioticus*, which had fallen from the side of a cliff undermined by a rivulet. Sir C. Lyell has suggested that this bone may have been derived from one of the Indian graves, which are very numerous in this locality. Dr. Usher, on the contrary*, regards this bone as "an undoubted fossil," belonging to the same period as the remains of the Mastodon with which it was discovered. Again, Count Pourtalis has found some human bones in a calcareous conglomerate, estimated by Agassiz to be ten thousand years old. The last case to which I will refer is that recorded by Dr. Douler, who obtained from an excavation near New Orleans some charcoal and a human skeleton, to which he is inclined to attribute an antiquity of no less than fifty thousand years.

The plain on which the city of New Orleans is built, and which rises only about ten feet above the sea level, consists of alluvial soil, which has been proved by borings to have a depth of more than five hundred feet, and which contains several successive layers of cypresses. The river banks show similar remains of ancient forests, and Messrs. Dickeson and Brown have found remains of no less than ten cypress forests

* Dr. Usher, in Nott and Gliddon's Types of Mankind, p. 344.

at different levels below the present surface. These trees are not unfrequently as much as ten feet in diameter, and there are from 95 to 120 rings in an inch. The human skeleton above referred to was found at a depth of sixteen feet, and "beneath the roots of a cypress-tree belonging to the fourth forest level below the surface*." Whether, therefore, we accept Dr. Douler's calculation or not, it is obvious that, if the statements are thoroughly trustworthy, this skeleton certainly must carry back the existence of man in America to a very early period.

Yet, until further evidence is obtained, the question cannot, I think, be regarded as entirely decided; and even if, on *à priori* grounds, the idea seems probable, there does not as yet appear to be any conclusive proof that man co-existed in America with the mammoth and mastodon.

* Dr. Usher, in Nott and Gliddon's Types of Mankind, p. 338.

CHAPTER IX.

QUATERNARY MAMMALIA.

IN addition to those still existing, the fauna of Northern Europe during the Palæolithic period comprised several species of mammalia which have either become entirely extinct, or very much restricted in their geographical distribution, since the appearance of man in Europe. The principal of these are—

Ursus spelæus (the cave-bear).
U. priscus.
Hyæna spelæa (the cave-hyæna).
Felis spelæa (the cave-lion).
Elephas primigenius (the mammoth).
E. antiquus.
Rhinoceros tichorninus (the hairy rhinoceros).
R. leptorhinus, Cuv.
R. hemitœchus.
Hippopotamus major (the hippopotamus).
Ovibos moschatus (the musk ox).
Megaceros hibernicus (the Irish elk).
E. fossilis (the wild horse).
Gulo luscus (the glutton).
Cervus tarandus (the reindeer).
Bison Europæus (the aurochs).
Bos primigenius (the urus).

The first ten of these have been regarded, until lately, as altogether extinct, but recent researches have induced many

naturalists to regard some of them as the direct ancestors of species still existing in other parts of the world, so that the Irish elk, the elephants, and the three species of rhinoceros are perhaps the only ones which are absolutely extinct. Most of the smaller species now inhabiting Europe already existed in Quaternary times, from which we may conclude that the changes which have taken place were due to a gradual change of circumstances, rather than to any sudden cataclysm, or general destruction of life: it is also very improbable that the extinction of the different species was simultaneous; and, acting on this idea, M. Lartet has attempted* to construct a palæontological chronology.

He considers that we may establish four divisions, namely, the age of the cave-bear, of the mammoth and rhinoceros, of the reindeer, and of the aurochs. It is evident, I think, that the appearance of these mammalia in Europe was not simultaneous, and that their disappearance has been successive. The evidence is very strong that in Central and Western Europe the aurochs survived the reindeer, and that the reindeer, on the other hand, lived on to a later period than the mammoth or the woolly-haired rhinoceros. But the chronological distinction between these two species and the cave-bear does not appear to be so well established. Admitting that the cave-bear has not yet been found in the river gravels of the Somme valley, we must remember that the animal was essentially a cave-dweller, and that its absence is, perhaps, to be attributed rather to the absence of caves than to the extinction of the species. Moreover, the bones found in the gravel are very much broken, and are seldom in such a condition as to enable the palæontologist to distinguish the remains of *U. spelæus* from those of other large bears.

There is as yet no evidence that the cave-bear existed in Europe before the commencement of the quaternary period,

* Ann. des Sci. Nat. 1861, p. 217.

when it appears to have been abundant in Central Europe, and in the southern parts of Russia. It is doubtful whether it has been discovered north of the Baltic, nor has it yet been found in Spain. In Italy, on the contrary, it has been met with, and in one instance apparently in conjunction with a polished stone implement, and even pottery*. Mr. Regnoli has been so good as to forward me a cast of the specimen on which this statement rests; it belongs to the cave-bear, but I can hardly regard it as being undoubtedly contemporaneous with the pottery and stone axe which were found near it. In Northern Europe no such case has yet been met with, but it is of course possible that in Italy the cave-bear may have survived to a more recent period than in the region north of the Alps. No trace of it has yet been found by Mr. Busk and Dr. Falconer, among the numerous remains from Gibraltar.

Perhaps the most interesting discovery of remains belonging to this species was that in Brixham Cave, which is thus described by Dr. Falconer in a letter to me, from which I quote, as the facts have not been so clearly stated in any published report:—"All the circumstances connected with the entire leg of cave-bear—femur, with tibia and fibula folded together, with the ball of astragalus partly dislocated, and its position in comminuted shale, below the ochreous cave-earth, and above a well-defined flint implement, were determined by me at Torquay and Brixham on September 2. Mr. Pengelly gave us the data. . . . . .

"I identified the remains and the flint, and drew the inference that the leg must have been introduced with its ligament at least fresh, after the flint manufactured by the hand of man had been introduced into the lower cave deposit."

Mr. Busk, however, who has carefully examined these

* Richerche Paleoetnologiche nelle Alpi Apuane. Nota del Dott. C. Regnoli.

bones, and detached them more completely from the matrix in which they were imbedded than was the case when they were examined by Dr. Falconer, is of opinion that there is no sufficient reason for referring them to *Ursus spelæus* rather than to one of the other large species of fossil bear.

It has been stated that remains of the cave-bear have occurred in the river gravels at Ilford and Gray's Thurrocks. In the opinion, however, both of Mr. Busk and Mr. Boyd Dawkins we have no clear case of the remains of this species being found in river-drift gravels. In fact, as materials for comparison have increased, it has proved more and more difficult to separate *Ursus spelæus* from other large species of bear. The jaws and teeth are characteristic, but the other portions of the skeleton are scarcely distinguishable, especially when they are so much fractured, as is generally the case with those found in gravel deposits.

Vogt, indeed, has expressed the opinion that every gradation may be traced between this species and our common brown bear (*Ursus Arctos*), and Brandt leans to the same opinion*. Mr. Boyd Dawkins also says that "those who have compared the French, German, and British specimens gradually realize the fact that the fossil remains of the bears form a graduated series, in which all the variations that at first sight appear specific vanish away†." Whether, however, the cave-bear will eventually be regarded as belonging to the same species as the brown bear or not, it will still remain a well-characterized variety, and one which has never yet been met with in the peat mosses, in the tumuli of Western Europe, in the Danish shell-mounds, the Swiss lake-villages, or, in short, associated with Neolithic remains.

* Zoogeographische und Palæontologische Beiträge, 1867, p. 220.

† Pleistocene Mammalia, Palæontographical Soc. v. xviii. p. xxii.

Mr. Busk* has recently made the very interesting observation that some remains of bear found in our British caves and gravels are identical with the corresponding bones of *U. ferox*, or grizzly bear of the Rocky Mountains.

The *cave-hyæna*, like the preceding species, is in Europe characteristic of the Palæolithic age, but it is now regarded as scarcely distinguishable specifically from the *Hyæna crocuta*, or spotted hyæna of Southern Africa.

Felis spelæa, the *cave-lion*, was on the whole of a larger size than the lions of the present day, and possesses in an exaggerated degree the characters by which that species is distinguishable from the tiger. It has hitherto been regarded as a distinct species, but Messrs. Dawkins and Sanford now consider† it as only a large variety of the lion. It has not yet been found in Scotland, Ireland, Scandinavia, Denmark, or Prussia. It occurs, however, in France, Germany, Italy, and Sicily. As long ago as 1672, Dr. John Hains figured a bone of this species from the Carpathians, an observation of considerable interest, as it carries the area of the *F. spelæa* so near to the mountains of Thessaly where, as Herodotus tells us, the camels attached to the army of Xerxes were attacked by lions‡. Messrs. Boyd Dawkins and Sanford refer also to the same species, the remains found at Natchez, in Mississippi, and which were described by Dr. Leidy as a new species under the name of *Felis atrox*. The characters, however, which induced Dr. Leidy to regard his specimens as distinct, are met with in some of the bones of *F. spelæa* from the Mendip Hills. If this opinion is correct, *F. spelæa* must have stretched eastwards across Russia and Siberia, where no remains of it have yet been observed. Inasmuch, however, as the mammoth, the musk ox, the reindeer, the

* Geol. Journal.

† Palæontological Soc. V. for 1868, p. 149.

‡ See also Mr. Newton's interesting Memoir on the Zoology of Ancient Europe, Cam. Phil. Soc., March, 1862.

bison, the elk, the horse, the wolf,—in short, many of our most characteristic quaternary mammalia—occur also in America, it seems *à priori* rather probable than otherwise, that Messrs. Dawkins and Sanford are correct in regarding *F. atrox* of that Continent as specifically identical with the *F. spelæa* of Europe.

Remains of a second large species of *Felis*, considered to be identical with the leopard, have been discovered in the bone-caves of England, France, Germany, Belgium, Italy, and Spain; and the lynx has been found by Dr. Ransom, in a Derbyshire cave.

The *Mammoth*, or *Elephas primigenius*, had very extensive geographical range. Its remains are found in North America, from the Atlantic coast to Escholtz Bay, and from Behring's Straits to Texas; in the old continent, from the farthest extremity of Siberia, to the extreme west of Europe, occurring, though rarely, even in Ireland; it crossed the Alps, and established itself in Italy as far southward as Rome, but it has not yet been discovered in Naples, south of the Pyrenees, in any of the Mediterranean Islands or in Scandinavia. In Denmark it occurs, though rarely.

In the extreme north, on the contrary, remains of this species are remarkably abundant. Kotzebue was struck by this in Escholtz Bay (N. W. America), and his remarks have been fully confirmed by Beechey*. The islands of Lachowski and New Siberia, are said to be almost made up of the bones of extinct animals, but particularly of the mammoth; from them and from other parts of Siberia so much fossil ivory is obtained that it forms a regular article of commerce. Nor have skeletons alone been discovered. In 1799 a Tungusian hunter discovered the body of a mammoth embedded in a cliff of frozen soil, where it remained for several years. In 1806 it was visited by Mr. Adams,

* Narrative of a Voyage to the Pacific, vol. i. p. 257.

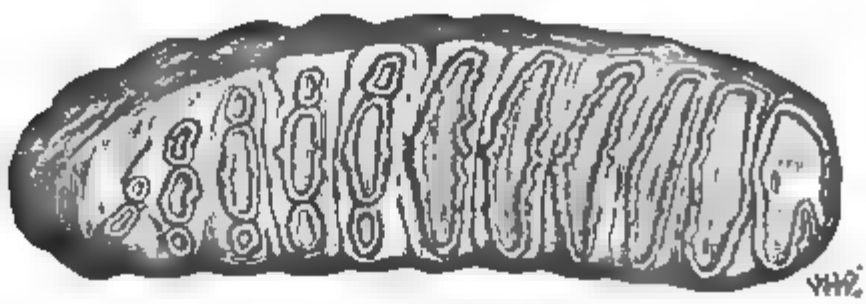
who found it partly devoured by wolves and other wild animals, and partly removed by the Yakuts, who used it as food for their dogs. Fortunately, however, a considerable portion of the animal still remained. The skin was dark grey, covered with reddish wool, mixed with long black bristles, somewhat thicker than horsehair. Since that time several other well-preserved portions of the mammoth have been discovered in Siberia, and it was probably from earlier discoveries of a similar nature that the Siberian tribes came to regard the mammoth as a gigantic burrowing animal.

It is hardly necessary to observe that the state of preservation in which mammoths have been found is no evidence of recent existence, for when once enveloped in frozen soil they might remain unchanged for an indefinite period. The best authorities consider that the mammoth and the woolly-haired rhinoceros lived in Siberia before, as well as during the glacial period, but neither of them has yet been found in Europe in any stratum anterior to the river-drift gravels, from which Murchison, De Verneuil, and Keyserling conceived that these animals lived in Siberia long before they found their way into Europe; that, in fact, they belong to the tertiary fauna of Northern Asia, though they did not make their appearance in Europe until the quaternary period. Falconer, on the contrary, was inclined to believe, principally from the specimens collected by the Rev. John Gunn and the Rev. S. W. King, that *E. primigenius* existed in England before the deposition of the boulder-clay. Mr. Gunn himself, however, regards these specimens as post-glacial, and we certainly do not at present appear to have any satisfactory evidence that the mammoth existed in England in pre-glacial times. Whatever doubt, however, there may be as to the date at which this species made its appearance in Europe, we can no longer doubt that our ancestors, or at least our predecessors, coexisted in England with the mammoth, which they no

doubt hunted, as the wildest tribes of Africa and India do now.

In Southern Europe undoubted remains of the existing African elephant have been met with, but the only other species which inhabited northen Europe during the quaternary period was the *Elephas antiquus*, remains of which have been found in English caves and river gravels, though, on the whole, it had a more southerly range than the mammoth. It is generally associated with *Rhinoceros leptorhinus* Cuv., while, on the contrary, the mammoth and *R. tichorhinus* usually occur together.

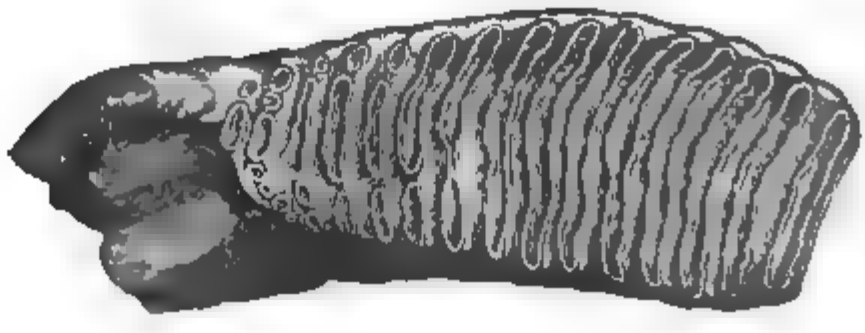
Fig. 179.



Molar Tooth of *E. antiquus*.

Fig. 179 represents a molar tooth of *E. antiquus*, and Fig. 180 one belonging to *E. primigenius*; it will at once be seen that the plates are much narrower in the latter than in the former.

Fig. 180.



Molar Tooth of Mammoth.

At least three species of rhinoceros inhabited Europe during the quaternary period; on this all are agreed, but, unfortunately the nomenclature is involved in very consider-

able confusion. *R. leptorhinus* was originally so named by Cuvier in 1812, from a drawing of a specimen found in the Val d'Arno, and in which the *osseous septum* between the nostrils was represented as deficient. In 1835, however, M. De Christol stated that he had examined the specimen in question, that the drawing was incorrect, and the name consequently inapplicable. Subsequently, however, Dr. Falconer visited Italy and satisfied himself that, after all, the original drawing was correct, and that therefore Cuvier's name must be restored. In the mean time Prof. Owen had unfortunately described another species of rhinoceros found at Clacton as *R. leptorhinus*, which name must of course be abandoned if Cuvier's name is permitted to stand. Hence Dr. Falconer proposed to call this latter species *R. hemitœchus*. It is necessary therefore to bear in mind that the *R. leptorhinus* of Owen is not the *R. leptorhinus* of Cuvier, but that it is the *R. hemitœchus* of Falconer, while M. Lartet maintains that it is identical with the *R. Merckii* of Kaup. On the other hand, M. De Christol, in 1835, described a rhinoceros, which undoubtedly wanted the nasal septum, and believing himself to have proved that the figure on which Cuvier based his description of *R. leptorhinus* was incorrect, he named this species *R. megarhinus*. Hence Cuvier's *R. leptorhinus* is identical with De Christol's *R. megarhinus*. The third species is the *R. tichorhinus* of Cuv., a name which has been generally adopted, although Blumenbach had previously proposed that of *R. antiquitatis*.

Mr. Boyd Dawkins considers that there is still some doubt about the real character of the specimen on which Cuvier founded his *R. leptorhinus*, and consequently adopts the following nomenclature: *R. megarhinus*, De Christol; *R. leptorhinus*, Owen; and *R. tichorhinus*, Cuvier. M. Lartet uses the names *R. leptorhinus*, Cuv.; *R. Merkii*, Kaup; and *R. tichorhinus*, Cuvier. These differences of opinion, however,

relate merely to the nomenclature, and do not touch the existence of the species themselves. The first two belonged to the pre-glacial as well as to the post-glacial period. The woolly-haired, two-horned, smooth-skinned *R. tichorhinus*, on the contrary, which appears to have been the commonest in post-glacial times, has not yet been proved to have existed in Europe in the period before the glacial epoch. The first two species also have a more southerly range, having been found in Italy and Spain, while *R. tichorhinus*, though it has been met with from the extreme north of Siberia*, throughout Central Europe and England, does not appear to have crossed either the Alps or the Pyrenees. It is somewhat remarkable that no remains of rhinoceros have yet been discovered in Sicily, Malta, Ireland †, or America ‡ in all of which countries the elephant has been met with. On the other hand a single tooth has, according to Brandt, been found in Scandinavia, where no remains of elephant have yet been met with.

The *Musk-ox*, or rather *musk-sheep*, is at present confined to the northern part of Arctic America. Its remains, however, occur in Siberia; and in 1856 Mr. Kingsley and I were so fortunate as to obtain a portion of a skull from the large gravel-pit near Maidenhead station. Since then I have met with it again at Greenstreet Green, near Bromley, in Kent; it has also been found in the gravel of the Avon, near Bath, in that of the Severn, near Gloucester, and at Crayford. In France it has been found twice; namely, in the valley of the Oise, and in the Dordogne.

The *Hippopotamus*, though hitherto regarded as a distinct species from the *H. amphibius* of Africa, was, if not identical

* In more than one instance the actual carcase of this animal has been found preserved like the Mammoth, by being imbedded in frozen soil.

† Lartet, Note sur deux têtes de Carnassiers Fossiles. Ann. d. Sci. Nat., 5 ser. vol. viii.

‡ D'Archiac, Lecons sur le Faune quaternaire, p. 196.

with, at any rate very closely allied to it. Some palæontologists believe that, like the mammoth and the *R. tichorhinus*, it was covered with hair; we have, however, no distinct evidence in support of this view. It may, moreover, be remarked, though too much importance must not be attached to the observation, that our ancient hippopotamus has been less frequently found in association with these two species, than with *E. antiquus* and *R. hemitœchus*, Falc. (*leptorhinus*, Owen), which, as just mentioned, have a more southerly range. Thus, in this country, it has only been found in four bone-caves, those of Durdham Down, Kirkdale, Kents Hole Cavern, and Ravenscliff in Gower, and in the two former it was associated with *E. antiquus* and *R. hemitœchus*. In the river gravels its remains are found at Grays and Ilford, associated with the *R. tichorhinus*, *R. leptorhinus*, and *R. hemitœchus;* at Walton and Folkestone, with *Elephas antiquus;* at Peckham, with *E. antiquus* and *E. primigenius;* at Bedford, with *E. antiquus*, the tichorhine rhinoceros, and the reindeer; and at Barton, with the mammoth and *R. hemitœchus**.

The magnificent Irish Elk, or *Megaceros hibernicus*, which attained a height of more than ten feet, with antlers measuring eleven feet from tip to tip, may perhaps have lived to a somewhat more recent period, but appears to have had a much more restricted range. Its remains have been found in Germany as far as Silesia, in France as far as the Pyrenees, and in Central Italy. It seems, however, to have been most abundant in the British Isles, and especially in Ireland. It is reported to have been frequently found in peat bogs, but Professor Owen believes that, in reality, the bones generally occur in the lacustrine shell marl, which underlies the peat or bog earth†.

* The British Pleistocene Mammalia. Palæontological Soc. 1866, p. xxviii.

† Owen, l. c. p. 465.

In the Niebelungen Lied of the twelfth century, a mysterious animal is mentioned under the name of schelch:

> After this he straightway slew a bison and an elk,
> Of the strong uri four, and one fierce schelch:

It has been supposed by some writers that the schelch was, in fact, the *Megaceros hibernicus*. There is, however, no sufficient reason for this hypothesis, and we must remember that the same poem, as Dr. Buckland has pointed out, contains allusions to giants, dwarfs, pigmies, and fire-dragons. Neither Cæsar nor Tacitus mention the Irish elk, and they would surely not have omitted such a remarkable animal, if it had existed in their time.

No remains of the Irish elk have yet been found in association with bronze, nor indeed am I aware of any which can be referred to the later Stone, or Neolithic Age.

These twelve species, then, are characteristic of the river-drift deposits. Most of them occur also in the loëss of the Rhine and its principal tributaries, but they have not yet been met with in the peat bogs. They never occur in the Kjökkenmöddings, the Lake-habitations, or the tumuli; nor are there any traditions in Western Europe which can be regarded as indicating, even in the most obscure manner, any recollection of these gigantic mammalia.

The *Wild Horses*, which in ancient times inhabited Europe, differed somewhat from our present breed, and have been described as separate races by Professor Owen, under the names of *Equus fossilis* and *Equus spelæus*. The latter is the race which was largely used for food by the ancient inhabitants of the Bruniquel Cave in Dordogne*. It was rather small in size, but appears to have resembled the true horse more than the ass*. Some naturalists have, indeed, been

* Owen, Philosophical Transactions, 1869, p. 535. See also Rutimeyer, Beiträge zur Kenntniss der fossilen Pferden.

disposed to believe that Europe contained two wild species of the genus *Equus* during quaternary times. This opinion, however, seems to depend on difference of size, rather than of form, and we know that the varieties of the horse differ considerably in magnitude.

Ekkehard in the "Benedictiones ad mensas Ekkehardi monachi Sangellensis" mentions "ferales equi" as existing in the eleventh century in Switzerland. Lucas David also (Reuss. Chronik. Bd. II. s. 121) alludes to the wild horse as existing in 1240 in Russia. Even at the beginning of the seventeenth century, Herberstain expressly says, "Feras habet Lithuania, præter eas, quæ in Germania referuntur, bisontes, uros, alces, *equos sylvestres*," etc.

Perhaps, however, these mediæval wild horses were merely tame ones which had escaped and bred in the extensive forests of Central Europe. Indeed, the history of the horse in Europe seems to have been much the same as in America. In the one country, as in the other, wild horses were at one time frequent, and their remains are abundant. The Spanish conquerors, however, found no trace or tradition of the horse at the time of the discovery of America, and so also in the Danish shell-mounds, and at the earlier Swiss lake-villages, the horse was either unknown, or at least extremely rare. Gradually it seems to have become again abundant, both in a domesticated and a wild condition; until at length, as population increased, the wild horse finally disappeared in Europe, as he seems destined ere long to do in America*.

The *Reindeer* still exists in Northern Europe, in Siberia, and in North America, where it has been found as far north as man has yet penetrated. Even so recently as the time of Pallas it might still be met with on the wooded summits of the Oural Mountains, as far south as the Caucasus. In

* See for further particulars Brandt, Zoographische und Palæontologische Beiträge, p. 176.

Western Europe it is now an extinct species, though it was at one time abundant in England and France, whence, however, it is unnecessary to say, it has long disappeared. M. Lartet found no traces of it in any of the Spanish caves examined by him; but Ponzi mentions it, though apparently with some little doubt, as occurring among the animal remains collected by M. Regnoli, at Cantalupo, near Rome *.

At the present day the reindeer, like the Laplander, is gradually retiring northwards, unable to resist the pressure of advancing civilization. Even within the last ten years a few families of Lapps might still be found in the neighbourhood of Nystuen, on the summit of the Fillefjeld, and some other places in the south of Norway, but none are now to be found on this side of the Namsen river. The reindeer, in a wild state, indeed, even at the present day, is generally distributed, though in small numbers, over the highest and wildest of the Norwegian fjelds, protected, however, by stringent game laws, but for which it would, probably, have ere now ceased to exist.

On the other hand, this species must have been at one time very abundant in Great Britain, no fewer than 1000 horns having been discovered by Col. Wood in some of the Welsh caves.

As far as we can judge from the present evidence, the first appearance of the reindeer in Europe coincided with that of the mammoth, and took place at a later period than that of the cave-bear or Irish elk. It is generally found wherever the mammoth and woolly-haired rhinoceros occur; but, on the other hand, as its remains are abundant in some of the bone-caves in which the gigantic Pachyderms are wanting, it is probable that it survived to a still later period. The rein-

* Rapporto sugli Studi e sulle Scoperte Paleoetnologiche nel Bacino della Campagna Romana. Roma, 1867.

deer has not, however, been found in the Kjökkenmöddings of Denmark, nor in any of the tumuli of England, France, or Germany. It is also wanting in the Swiss lake-villages, although we know that it was at one time an inhabitant of Switzerland, bones of it having been found in a cave at L'Echelle, between the great and little Salève, near Geneva, where they were mixed with worked flints, ashes, and remains of the ox and horse.

As might naturally have been expected, the reindeer has been occasionally met with in the peat mosses of Sweden, as well as in those of Scotland and England. It is not, however, represented on any of the ancient British or Gallic coins. Cæsar, indeed, mentions it as existing in the great Hercynian forest; but his description is both imperfect and incorrect. He seems to have heard of it only at second hand, and never to have met with any body who had actually seen one. It does not appear to have ever been exhibited in the Roman circus.

Buffon stated on the authority of Gaston, Comte de Foix, that in his time (1331 to 1390) the reindeer still lived in the south of France. Cuvier, however, by examining an ancient manuscript, sent by Gaston himself to Philippe le Hardi, showed that, though his expression is a little ambiguous, he probably intended to say exactly the reverse, his words being—

"J'en ay veu en Nourvegne et Xuedene et en ha oultre mer, mes en Romain pays en ay je peu veu*."

Remains of the reindeer have been found in Scotland in beds of marl and till, and also, though very rarely, in peat†. Dr. Hibbert‡, Brandt§, Dawkins, J. A. Smith, and other good

* Recherches sur les Ossements Fossiles, vol. vi. p. 125.

† See Dawkins, Popular Science Review, Jan. 1868. Smith, Proc. Soc. Ant. Scot., 1869, p. 186.

‡ Edinburgh Journal of Sci., 1831.

§ Zoogeogr. und Palæont. Beiträge (1867), pp. 62. 256.

authorities, consider that it survived in the extreme north down to the twelfth century; relying on the statement of Torfæus, that the Norwegians used to make incursions from the Orkneys into Caithness for the purpose of hunting reindeer (hreina) and other game*.

While, however, fully admitting the high authority of Torfæus, I cannot regard a casual statement of this character as conclusively deciding the question, and I may add that Dr. Dasent, who is so great an authority on all questions connected with Scandinavian literature, is convinced that the reindeer was extinct in Scotland at the period in question. It may also be remarked that several attempts which have been made to introduce the reindeer into Scotland have completely failed, the animals dying without any very apparent reason, while, on the contrary, in Iceland they have become numerous. I admit that these experiments are far from conclusive; but, on the other hand, in Scandinavia the deer are said to be larger in the northern districts than in the southern, while the Spitzbergen specimens are the finest of all.

If indeed Torfæus had distinctly stated that the reindeer existed in northern Scotland during the twelfth century, the state of the case would have been very different; the passage referred to, however, could hardly be accepted as conclusive by itself, especially as long as no traces of reindeer had been found among the ancient ruins which abound in that district. On the other hand, since the last edition of this work was published, Mr. J. A. Smith has carefully examined the horns and bones found in the ruins of the curious towers known as "Brochs," or "Burghs," and has shown that some of them certainly belonged to the reindeer†. Thus fragments of reindeer's horns have been collected by Mr. Joass among the ruins of the Cill-Trölla Broch, on the farm of Kintradwell,

* Rerum Orcadensium His., i. 36.

† Proc. Soc. Antiq. Scot., 1869, vol. viii. p. 186.

near Brora, on the sea-coast of Sutherlandshire. Mr. Smith, on carefully examining the remains of deer obtained by Mr. Laing at Keiss, in Caithness, finds that they do not all belong, as at first supposed, to the red deer, but that some of them belonged to the reindeer. Lastly, remains of this species have been collected by Mr. Anderson in the ruins of the Yarhouse Broch, in the same county. It is indeed more than probable that in other cases remains of the reindeer have been incorrectly ascribed to the red deer.

We do not unfortunately know the date at which these Burghs or Brochs were first constructed, but it is on record that some of them were in use down to the twelfth century (see ante, pp. 54, 55).

It must be admitted that these observations strongly support the inference derived from the statement of Torfæus, and we have therefore now, not I think conclusive, but still very strong grounds for believing that the reindeer survived in northern Scotland down to a comparatively recent period.

The *glutton* of Northern Europe, which is the wolverine of the North American fur-hunters, has been found in three of the English bone-caves, and is very abundant in those of Belgium.

The Aurochs, or European Bison, appears to have been abundant in Western Europe. It has been found in Scotland, England, France, Germany, Denmark, Sweden, Poland, and Italy, as well as in Russia. Its remains occur in the river-drift gravels, the bone-caves, the lake-villages of Switzerland, and in the peat-bogs, though none have yet been found in the shell-mounds of Denmark, nor, so far as I am aware, in any of our British peat-bogs or tumuli. M. Lartet thinks that it is represented on a coin of the Santones, which was shown to him by M. de Saulcy. It is stated by Pliny and Seneca to have existed in their times, with the urus, in the great forests of Germany. Though not mentioned by

Cæsar, it is alluded to in the Niebelungen Lied, and is said to have existed in Prussia down to the year 1775. According to Nordmann and Von Baer, it still survives in some parts of Western Asia.

It is also preserved by the Emperor of Russia in the imperial forests of Lithuania, where, however, its existence seems to be very precarious. In 1830 the herd numbered 711 head, of which, during the Polish revolution in 1831, 115 were killed. From that time they gradually increased until 1857, when the numbers were 1898, but during the late Polish rebellion they fell to 874. Since 1863 no numbers have been given.

According to Rütimeyer, than whom it is impossible to cite a greater authority on such a question, our ancient bison (*B. priscus*) was identical with the existing American bison. Every stage, however, between the fossil form and the existing European aurochs can be traced, so that it is impossible to separate the two specifically, an opinion in which Brandt also coincides. It would appear, therefore, that the American form of bison is the more archaic. We have here, moreover, a clear case, in which two now distinct species are connected by the evidence of fossil remains.

The Urus or *Bos primigenius* did not extend its range to America, nor, so far as I am aware, have its remains yet been met with in North-Eastern Asia. They occur, however, throughout Europe, in England, Scotland, Denmark, and the South of Sweden, in France and Germany. Across the Alps and Pyrenees, it occurs in Italy and Spain, and even, according to M. Gervais, in Northern Africa. In the museum at Lund is a skeleton belonging to this species, in which one of the vertebræ still shows traces of a wound, made, in the opinion of Professor Nilsson, by a flint arrow. Bones of this species have also been met with in ancient tumuli, as well as in the lake-habitations, and the Kjökkenmöddings.

Cæsar particularly mentions the urus as occurring in the Hercynian forest; it is alluded to in the Niebelungen Lied, and, according to Herberstain, it existed in Germany down to the sixteenth century. In England wild bulls are mentioned by Fitz-Stephen, in his Life of Becket, as occurring near London as late as the twelfth century. It does not seem certain, however, that these were uri. The celebrated wild cattle of Chillingham, and some of our domestic breeds, are generally regarded by Palæontologists as being descended from the ancient urus.

Mr. Dawkins is also of opinion that *Machairodus latidens*, one of the most remarkable of the Pliocene carnivora, survived to post-glacial times. It was found by MacEnery in Kent's Hole, but has not been met with in the present examination of that interesting cavern. Nor has it occurred in any other of our bone-caves or river gravels with remains of post-glacial mammalia. The *Norway Elk*, which is identical with the American moose, was also an inhabitant of this country, but has long become extinct here, as indeed throughout Western Europe. Even in Prussia it is said that there are only about 226 remaining*. The lemming has been discovered by Dr. Blackmore, in the river gravels at Fisherton, near Salisbury; and the lagomys, or tailless hare, a genus now confined to the Himalayas, Siberia, and the colder regions of North America, has been identified by Prof. Owen among the bones from Kent's Cavern, and by Dr. Falconer among those from the Brixham Cave. Another glacial genus, that of the marmots, is represented by two species, one of them very closely resembling that now living in Siberia. Lastly, it may be observed that remains of the great snowy owl (*Strix nivea*) have recently been discovered in France.

* See Report from Her Majesty's representatives abroad, on the laws and regulations relating to game. Presented to Parliament, 1871.

The river gravels contain also thirty-six species of shell-fish, of which thirty-four at present live in Sweden*, and twenty-nine in Lombardy. These latter, however, are principally species having a very wide range, and we shall see still more clearly that the leaning of the molluscan fauna is towards the north, if we remember that out of seventy-seven Finland species, thirty-one have been found in the upper level gravels, while of 193 Lombard species, only twenty-nine have as yet occurred.

Another very interesting point connected with this quaternary fauna is the manner in which it connects together species now quite distinct. Opponents of Mr. Darwin's theory often ask with misplaced triumph for the links connecting any two species. In fact, however, every species is a link between other allied forms. Of course, indeed, as long as any varieties remain undescribed there will be intervals—indicating, however, gaps in our knowledge, not in nature. Moreover, it is admitted by every one that there are variable species, that is to say, species which present two or more extreme forms, with intermediate gradations. Now we may fairly ask those who assert that no two species are connected by links, how they would separate the instances of variable animals (which they admit to occur) from the case which they say does not exist. If we were to obtain to-morrow all the links between any two species which are now considered distinct, no one can deny that the two would at once be united, and would hereafter appear in our classifications as one variable species. In fact, therefore, they first unite into one species all those forms, however different, between which a complete series is known, and then argue in favour of the permanence of species because no two of them are united by intermediate links.

Moreover, if species were in reality perfectly distinct from

* Proc. Roy. Soc., 1862, p. 44.

one another, then it would necessarily follow that as our knowledge of any group increased, the separations between the different species would become more and more unmistakable. On the contrary, however, it is a well-known fact that the difficult genera become still more difficult as they are more profoundly studied. If, indeed, we consider existing forms only, no doubt the distinctions between the greater number of species are well marked, nor does any one expect to find a living series of links between them. The intermediate forms lived in tertiary and quaternary times. Thus directly we commence to study the extinct forms, all the convenient lines of separation gradually thin out. For instance, the larger species of mammalia are at present in most cases well marked, but it becomes much more difficult satisfactorily to distinguish them from one another, when we consider fossil specimens as well as recent ones. Thus, to take only two cases from the group of quaternary mammalia, we have seen that, according to Rütimeyer, the European and American bisons, which are now quite distinct, are connected by the *Bison priscus*, while between our brown bear and the grizzly bear of the Rocky Mountains a series of links has been discovered among the abundant remains in our bone-caves.

Great as is the interest attaching to the existence of man at a period so much more ancient than that hitherto assigned to him, there is something which, to many minds, will appear even more fascinating in the presence of such a fauna as that which I have thus briefly indicated. For it must be regarded as a well-ascertained fact, that, even during the human period, the pleasant and sunny valleys of England and of France have been inhabited by the gigantic Irish elk, two species of elephant, and three of rhinoceros, together with the reindeer, a large bear closely resembling the grizzly bear of the Rocky Mountains, a bison scarcely distinguishable from that of the American Prairies, the musk ox of Arctic

America, the lemming of the Siberian Steppes, the lion of the Tropics, the hyæna of the Cape, and a hippopotamus closely resembling that of the great African rivers.

Influenced mainly by the presence of the great pachyderms, and particularly by that of the Hippopotamus, M. d'Archiac is disposed to consider that the climate of the quaternary period was warmer than ours *, while M. Lartet † suggests that we may have had a climate like that of Chili, where, as Mr. Darwin has pointed out, glaciers actually come down to the sea-level in latitudes corresponding with that of our south coast, and the northern provinces of France.

In other respects, however, the fauna of the quaternary deposits indicates a more severe climate. The presence of the reindeer and musk ox, the lemming and the marmot, corroborated as we shall see in the next chapter by physical evidence, leave little doubt on this subject. Moreover, we must remember that the tichorhine rhinoceros and the mammoth were not only well provided against cold, but in some cases were enveloped in the ice and frozen mud of the Siberian rivers so soon after death that the flesh had not had time to decay. Much weight is also to be attributed, I think, to the smaller quadrupeds, as, for instance, the lemming and lagomys.

Yet I feel strongly that some of the species, and particularly the hippopotamus, point to a warmer climate. Even if protected by fur, as Mr. Prestwich supposes, the animal could never live in a country where the rivers were frozen every winter. To meet this difficulty a suggestion has been thrown out that it may have made annual migrations. In the Gulf of Penas, on the west coast of South America, lat. 47° S., Mr. Darwin has pointed out that glaciers now "descend to the sea within less than nine degrees of latitude from where

* Lecons sur la Faune Quaternaire, pp. 15, 16.

† Lartet, Ann. des Sc. Nat., 1867, p. 37.

palms grow, less than two and a half from arborescent grasses, less than two from orchideous parasites, and within a single degree of tree-ferns*." The reindeer in America makes, we know, very extensive annual migrations, but a heavy animal like the hippopotamus would hardly do so. I am, therefore, rather disposed to believe that the presence of the hippopotamus, the *E. antiquus*, and *R. leptorhinus*, indicates that the climate of the quaternary period was not uniformly severe, but contained at least one interval of exceptional mildness.

It is remarkable also that the late M. Morlot, well known as an excellent and careful observer, considered it to be certain that, in Switzerland, there were two periods of great extension of the glaciers, separated by an epoch of comparative warmth.

We shall also see presently that if the cold of the glacial epoch was due to the astronomical causes pointed out by Mr. Adhemar and Mr. Croll, the period of extreme cold must have been followed by one of unusual warmth, or rather there must have been several oscillations of climate from unusual heat to extreme cold.

I am disposed then, on the whole, to consider that the quaternary fauna consists of two distinct groups, belonging to different periods and to two different conditions of climate, one warmer than the present, the other colder. The whole subject, however, while it is of great interest, is also of extreme difficulty. On many points we must be contented to suspend our judgment, but we may at least regard it as proved that, since the appearance of man, there have been great changes in the fauna of Western Europe, which then contained several important species, either now altogether extinct or existing only in distant parts of the world.

* Researches in Geology and Natural History, p. 285.

CHAPTER X.

CAVE MEN.

IT would be quite impossible, within the limits of a single chapter, to describe all the caves in which human remains have been found, in association with, and apparently belonging to the same period as, those of the extinct mammalia. I will only call attention to a few of those which have been most thoroughly examined, and in which the conclusions appear to be satisfactorily established.

It is unnecessary to observe that a great number of caves present evidence of having been inhabited during times long subsequent to those which we are now considering; but for the Neolithic Age, as well as for all later periods, we have, as has been already mentioned, other sources of information, and more satisfactory evidence than any which can be derived from the examination of caves.

Some writers, indeed, have gone so far as to question altogether the value of what may be called cave-evidence. They have suggested that the bones of extinct animals may have lain in the caves for ages before the appearance of man; that the relics of the human period may have been introduced subsequently; and that remains belonging to very different periods may have been mixed together. This was, for instance, the conclusion arrived at by M. Desnoyers, even so recently as the year 1845, in his article on Bone-caves*. Unless this

* Recherches Géologiques et Historiques sur les Cavernes, particulièrement sur les cavernes à ossements. Dictionnaire Universel d'Histoire Naturelle.

argument admitted of a satisfactory answer, it must be conceded that the evidence derivable from cave contents would always be liable to grave suspicion. I trust, however, to be able to show that this is not the case.

Already, in the year 1828, MM. Tournal and Christol in the south of France had found fragments of pottery and human bones and teeth, intermingled with remains of extinct animals; and M. Tournal distinctly expressed the opinion that these had certainly not been washed in by any diluvial catastrophe, but must have been introduced gradually. The presence of pottery, however, throws much doubt on the supposed antiquity of these remains.

A few years later, in 1833 and 1834, Dr. Schmerling* published an account of his researches in some caves near Liége in Belgium. In four or five of these he found human bones, and in all of them rude implements, principally flint flakes, were discovered, scattered in such a manner among the remains of the mammoth, *Rhinoceros tichorhinus*, cave-hyæna, and cave-bear, that Dr. Schmerling referred them to the same period. One feels a natural surprise that such animals as these should ever have been natives of England and France, ever have wandered about among our woods or along our streams; but when it was also suggested that they were contemporary with man, surprise was succeeded by incredulity. Yet these cave-researches appear to have been conducted with care, and the principal results have been confirmed by more recent discoveries.

The hesitation, however, with which the statements of Dr. Schmerling were received by scientific men arose, no doubt, partly from the fact that some of the fossil remains discovered by him were certainly referred to wrong species, and partly because, with reference to several of the extinct

* Recherches sur les Ossements Fossiles découverts dans les Cavernes de la Province de Liége. Par le Dr. P. C. Schmerling.

species, and especially to the mammoth, he expressed the opinion that the remains had been brought from a distance, and had very likely been washed out of some earlier bed. "Nous n'hésitons point," he says, "à exprimer ici notre pensée, c'est que nous doutons fort que l'éléphant, lors de l'époque du remplissage de nos cavernes, habitât nos contrées. Au contraire, nous croyons plutôt que ces restes ont été amenés de loin, ou bien que ces débris ont été déplacés d'un terrain plus ancien et ont été entraînés dans les cavernes."

Even, therefore, though Dr. Schmerling might be quite right in his conclusion that the human remains had been "enfouis dans ces cavernes à la même époque, et par conséquent par les mêmes causes qui y ont entraîné une masse d'ossements de différentes espèces éteintes," still it would not necessarily follow that man had *lived* at the same period as these extinct species.

Careful explorations of the Belgian caves have recently been carried on under the auspices of the Government by M. E. Dupont*. These caverns belong principally to the so-called Reindeer period, and the flint implements are never ground. Thus out of 30,000 worked flints found in the cavern of Chaleux, and 1200 in those of Furfooz, not one presents a trace of polish. Some of these flint flakes, etc., appear to consist of Pressigny flint, and in the opinion of Dr. Dupont, as well as of M. de Mortillet, must have come from that distant locality. In this cavern the humerus of an elephant was discovered, but in M. Dupont's opinion, founded on the state of the bone, it belonged to an earlier period than the other remains. Human bones have been found in several of these caverns. The Trou du Frontal contained bones belonging to no less than thirteen individuals. They had

* Notices Preliminaires sur les Fouilles exécutées sous les Auspices du Gouvernement Belge dans les Cavernes de la Belgique. 1867.

probably been buried in the cave, the door of which seemed to have been purposely closed by a large block of stone. When discovered they were in great confusion, having in the opinion of MM. Dupont and Van Beneden been disturbed and rearranged by water. The form of the cavern, and the fact that the opening was in great measure closed by the above-mentioned stone, seem to me to speak strongly against this suggestion, and I should rather regard the disturbance of the bones as due to foxes and badgers. The Trou de la Naulette contained a very remarkable lower jaw, of which M. Dupont says that "regardée dans la face interne, elle offre une telle proclivité d'arrière en avant de la partie symphysaire qu'on est porté à y voir un prognatisme tout animal. Les apophyses géni ne sont pas indiquées; les fossettes latérales sont tres-prononcées et le rebord mentonnier est réduit à son minimum. Les alvéoles des canines, bien que très-rapprochées des alvéoles des incisives, et les molaires, nous rappellent la disposition qu'on observe sur la mâchoire du singe. En effet, l'alvéole qui logeait la canine est fort vaste et bombée à la face externe. Ce qui semble plus étrange encore, c'est que les trois alvéoles des grosses molaires présentent absolument l'ordre typique du maxillaire simien par l'augmentation progressive des alvéoles de la première à la deuxième et à la troisième molaire."

The celebrated cavern of Kent's Hole, near Torquay, was examined by Mr. MacEnery as long ago as 1825. He did not, however, publish his notes on the subject, and they remained in manuscript until 1859, when Mr. Vivian succeeded in obtaining them. Mr. MacEnery found human bones, flint flakes, etc., but all either on the surface or in disturbed soil, so that on the whole he regarded them, though apparently with much doubt, as posterior to the remains of the cave-bear, hyæna, etc.

In the year 1840 Mr. Godwin-Austen communicated to

the Geological Society a memoir on the Geology of the South East of Devonshire*, and in his description of Kent's Hole, he says that "human remains and works of art, such as arrow-heads and knives of flint, occur in all parts of the cave, and throughout the entire thickness of the clay: and no distinction founded on condition, distribution, or relative position, can be observed, whereby the human can be separated from the other reliquiæ," which included bones of the "elephant, rhinoceros, ox, deer, horse, bear, hyæna, and a feline animal of large size." The value, he truly adds, "of such a statement must rest on the care with which a collector may have explored. I must therefore state that my own researches were constantly conducted in parts of the cave which had never been disturbed, and in every instance the bones were procured from beneath a thick covering of stalagmite; so far, then, the bones and works of man must have been introduced into the cave before the flooring of stalagmite had been formed." Notwithstanding the high authority of Mr. Godwin-Austen, these statements attracted little attention; and the very similar assertions made by Mr. Vivian, in a paper read before the Geological Society, were considered so improbable that the memoir containing them was not published.

They have, however, been completely confirmed by the systematic examination which is now being carried on by the British Association. Worked flints are less abundant in the lower layers than near the surface, but several have been discovered under circumstances which leave no doubt that they were deposited at the same time as the bones of the large mammalia. The researches are carried on by a committee, consisting of Sir C. Lyell, Mr. Busk, Mr. Evans, Prof. Phillips, Mr. Vivian, Mr. Pengelly, and myself, and the work is under the more immediate superintendence of Mr. Pengelly and Mr. Vivian.

* Transactions of the Geol. Soc., Ser. 2, vol. vi. p. 433.

In May, 1858, Dr. Falconer called the attention of the Geological Society to a newly-discovered cave at Brixham, near Torquay, and a committee was appointed to assist him in examining it. Grants of money were obtained for the same object from the Royal Society and Miss Burdett Coutts. In addition to Dr. Falconer, Mr. Pengelly, Mr. Prestwich, and Professor Ramsay were entrusted with the investigations. In September, 1858, a preliminary report was made to the Geological Society, but it is very much to be regretted that the results have not yet been published in extenso.

The deposits in the cave were, in descending order—

1. Stalagmite of irregular thickness.
2. Ochreous cave-earth with limestone breccia.
3. Ochreous cave-earth with comminuted shale.
4. Rounded gravel.

The organic remains belonged chiefly to the following species:

1. *Elephas primigenius.*
2. *Rhinoceros tichorhinus.* Teeth in considerable numbers and an astragalus.
3. *Bos sp.* Teeth, jaws, and other bones.
4. *Equus sp.* A few remains.
5. *Cervus tarandus.* The reindeer—skull and horns.
6. *Cervus elaphus.* Horns.
7. *C. capreolus.*
8. *Ursus spelæus*—the cave-bear. Lower jaws, teeth, etc.
9. *U. feroæ.*
10. *U. arctos.*
11. *Hyæna spelæa.* Lower jaws, teeth, fragments of skulls, and other bones.
12. *Felis spelæa.*
13. *Lagomys.*

Several flint flakes were also found indiscriminately mixed with these bones, and, according to all appearance, of the

same antiquity. They occurred at various depths, from ten inches to eleven feet, and some of them were in the gravel, below the whole of the ochreous cave-earth.

Again, in the grotto of Maccagnone, in Sicily, Dr. Falconer found human traces, consisting of ashes and rude flint implements, in a breccia containing bones of the *Elephas antiquus*, of the hyæna, of a large *Ursus*, of a *Felis* (probably *F. spelæa*), and especially with large numbers of bones belonging to the hippopotamus. The "ceneri impastati," or concrete of ashes, had at one time filled the cavern, and a large piece of bone breccia was still cemented to the roof, but owing to some change in the drainage, the greater part had been washed out again. The presence of the hippopotamus sufficiently proves that the geographical conditions of the country must have been very different from what they are now; but I cannot do better than quote Dr. Falconer's own summary of his observations in this case:

"The vast number of *Hippopotami* implied that the physical condition of the country must have been greatly different, at no very distant geological period, from what obtains now. He considered that all deposits *above* the bone breccia had been accumulated up to the roof by materials washed in from above, through sinuous crevices or flues in the limestone, and that the uppermost layer, consisting of the breccia of shells, bone-splinters, siliceous objects, burnt clay, bits of charcoal, and hyæna coprolites, had been cemented to the roof by stalagmitic infiltration. The entire condition of the large fragile *Helices* proved that the effect had been produced by the tranquil agency of water, as distinct from any tumultuous action. There was nothing to indicate that the different objects in the *roof breccia were other than of contemporaneous origin:* subsequently a great physical alteration in the contour, altering the flow of superficial water and of the subterranean springs, changed all the conditions previously existing,

and emptied out the whole of the loose incoherent contents, leaving only the portions agglutinated to the roof. The wreck of these ejecta was visible in the patches of 'ceneri impastati,' containing fossil bones, below the mouth of the cavern. That a long period must have operated in the extinction of the hyæna, cave-lion, and other fossil species is certain, but no index remains for its measurement. The author would call the careful attention of cautious geologists to the inferences—that the Maccagnone Cave was filled up to the roof within the human period, so that a thick layer of bone splinters, teeth, landshells, hyænas' coprolites, and human objects, was agglutinated to the roof by the infiltration of water holding lime in solution. That subsequently, and within the human period, such a great amount of change took place in the physical configuration of the district as to have caused the cave to be washed out and emptied of its contents, excepting the patches of material cemented to the roof and since coated with additional stalagmite."

Similar proofs of great and recent geographical changes have been afforded by the examination of certain Spanish caves. The rock of Gibraltar abounds in caverns containing human remains, with stone, bone, and bronze implements, mixed with those of domesticated animals, such as the goat and ox. In the bone breccia from the Genista Cave and fissure, Mr. Busk and Dr. Falconer have discovered *Hyæna crocuta*, an existing African species, the leopard, lynx, serval, and Barbary stag, together with *Rh. hemitæchus* and a species of ibex. But, although it is more than probable, it does not appear to be proved, that man co-existed with these animals on the rock of Gibraltar. Among some bones found in another cave near Madrid, M. Lartet has discovered molars of the existing African elephant.

M. Lartet* has also described with his usual ability an

* Ann. des Sc. Nat., 1861, p. 177.

interesting grotto, or small cave, which was discovered some years ago at Aurignac, in the south of France. A peasant named Bonnemaison, seeing a rabbit run into a hole on a steep slope, put his hand in, and to his surprise pulled out a human bone. Curiosity urged him to explore farther, and on removing a quantity of rubbish, he found a large block of stone, which almost closed up the entrance to a small chamber, in which were no less than seventeen human skeletons. Unfortunately for science, the mayor of Aurignac, hearing of these discoveries, collected the human bones, had them reburied, and when M. Lartet some years afterwards explored the cavern, they could not be found again.

After carefully examining the locality, M. Lartet came to the conclusion that this small cavern had been used as a burial place, and from the remains of bones broken for marrow, and marks of fire immediately outside the cave, he inferred that funeral feasts had been held there.

The following is the list of species determined by M. Lartet, together with the approximate number of individuals belonging to each :—

	Number of individuals.
1. Cave Bear (*Ursus spelæus*)	5— 6
2. Brown Bear (*U. arctos ?*)	1
3. Badger (*Meles taxus*)	1— 2
4. Polecat (*Putorius vulgaris*)	1
5. Cave Lion (*Felis spelæa*)	1
6. Wild Cat (*F. catus*)	1
7. Hyæna (*Hyæna spelæa*)	5— 6
8. Wolf (*Canis Lupus*)	3
9. Fox (*C. vulpes*)	18—20
10. Mammoth (*Elephas primigenius*). Two molars and an astragalus.	
11. Rhinoceros (*Rhinoceros tichorhinus*) .	1

12. Horse (*Equus caballus*) . . . . . 12—15
13. Ass*? (*E. asinus*) 1
14. Boar (*Sus scrofa*). Two incisors.
15. Stag (*Cervus elaphus*) 1
16. Irish Elk (*Megaceros hibernicus*) . . 1
17. Roe (*C. capreolus*) . . . . . 3—4
18. Reindeer (*C. tarandus*) . . . . . 10—12
19. Aurochs (*Bison Europæus*) . . . . 12—15

Some of these were found in the grotto, others outside; the latter had been gnawed by some large carnivorous animal, no doubt the hyæna, coprolites of which were found among the ashes. On the other hand, the bones inside the cave were untouched, from which M. Lartet concludes that after the funeral feasts, hyænas came and devoured all that had been left by the men, but that they could not effect an entrance into the cave on account of the large block of stone by which the entrance was closed, and which was actually found in its place by Bonnemaison.

In addition to the hyæna, the animals occurring in this list, and yet no longer existing, or known historically to have existed in France, are the reindeer, cave-bear, rhinoceros, cave-lion, Irish elk, and mammoth. The contemporaneity of the reindeer with man is very evident; all the bones are broken for marrow, and many bear the marks of knives, besides which, the greater number of the bone implements are made out of the bones or horns of this species. That the rhinoceros also was contemporaneous with man is inferred by M. Lartet, firstly, on chemical grounds, the bones of this species, as well as those of the reindeer, aurochs, etc., having retained the same amount of nitrogen as the human bones from the same locality; and secondly, because the bones

* This is, I presume, a small variety of horse, and not the true Ass. The query is in the original.

appear to have been broken by man, and in some cases are marked by knives. Moreover, he has ingeniously pointed out that these bones must have belonged to an individual recently killed, because, after having been broken by man, they were gnawed by the hyænas, which would not have been the case if they had not been fresh and still full of their natural juices.

The elephant was represented only by some detached plates of molars and a calcaneum. This latter was the *only* gnawed bone found in the interior of the grotto. He is of opinion that these plates were purposely separated, and the calcaneum appears to have been placed in the vault at the time of the last interments; but there is no evidence that it was then in a fresh condition. Indeed, the fact of its being gnawed seems rather to point the other way.

Remains of the *Ursus spelæus* (cave-bear) were much more abundant, and some of them were found in the grotto. In one case a whole limb appears to have been buried with the flesh on, as the different bones were all found together. It is well known that food and drink were in ancient times frequently buried with the dead, and M. Lartet thinks that we may account in this manner for the bones of quadrupeds found in the grotto at Aurignac.

I have given the particulars of this case at length, because, if the evidence was well-established, we should here have an instance of a sepulture belonging to the period at which the cave-bear, the reindeer, the Irish elk, the woolly-haired rhinoceros, and probably the mammoth, still lived in the south of France. It is, however, much to be regretted that M. Lartet was not present when the place was first examined; and, under all the circumstances, we cannot, I think, feel satisfied that the human remains found in this cave were certainly coeval with those of the extinct mammalia.

Another remarkable case is that of the Hyæna-den at

Wokey Hole, near Wells, which has been ably explored and described by Mr. Boyd Dawkins*. In this instance the cave was filled with *débris* up to the very roof, and it appears that the accumulation of material was partly due to the disintegration of the dolomitic conglomerate forming the roof and walls of the cavern, and partly to the sediment washed in gradually by rain and small streams. It is evident that the bones and stones were not brought into the cave by the action of water; firstly, because none of the bones are at all rolled; secondly, because, though several rude flint implements were found in the cave, *only one single unworked* flint was met with; and thirdly, because, in some cases, fragments of the same bone have been found close together, while, if they had been brought from a distance, it is almost incredible that they should have been again deposited close to one another. Again, there are several layers—one over the other —of album græcum, that is to say, the excrement of hyænas, each of which indicates, of course, an old floor, and a separate period of occupation; so that the presence of, at least, one such floor above some of the flint implements, proves two things; firstly, that the hyænas which produced the album græcum occupied the cave after the savages who used the flint instruments; and, secondly, that these implements have not been disturbed by water since the period of the hyæna.

During the last years of his life, Mr. Christy, whose death has been so great a loss to science, examined, in conjunction with M. Lartet, with great care a number of small caves and rock-shelters in the Dordogne, some of which had already attracted the attention of archæologists†. These caves are particularly interesting, because, so far, at least, as we can judge from the present state of the evidence, the remains

* Geol. Journal, May, 1862, p. 115.

† De l'Origine et de l'Enfance des Arts en Périgord. Par M. l'Abbé Audierne.

found in them belong to M. Lartet's reindeer period, and tend, therefore, to connect the later Stone or Neolithic Age with the period of the river-drifts and the great extinct mammalia; representing a period about which we had previously very little information. Those which have been most carefully examined are ten in number, viz. Laugerie, La Madelaine, Les Eyzies, La Gorge d'Enfer, Le Moustier, Liveyre, Pey de l'Azé, Combe-Granal, and Badegoule, most of which I have myself had the advantage of visiting. Some of these, as, for instance, Les Eyzies and Le Moustier, are at a considerable height above the stream, but others—as those at La Madelaine and Laugerie—are little above the present flood-line, showing, therefore, that the level of the river is now nearly the same as it was at the period during which these caves were inhabited.

The rivers of the Dordogne run in deep valleys cut through calcareous strata; and while the sides of the valleys in chalk districts are generally sloping, in this case, owing probably to the hardness of the rock, they are frequently vertical. Small caves and grottoes frequently occur; besides which, as the different strata possess unequal power of resistance against atmospheric influences, the face of the rock is, as it were, scooped out in many places, and thus "rock-shelters" are produced. In very ancient times these caves and rock-shelters were inhabited by men, who have left behind them abundant evidences of their presence. But as civilization advanced, Man, no longer content with the natural but inconvenient abode thus offered to him, excavated chambers for himself, and in places the whole face of the rock is honeycombed with doors and windows leading into suites of rooms. often in tiers one over another, so as to suggest the idea of a French Petra. Down to a comparatively recent period, as, for instance, in the troublous times of the Middle Ages, many of these, no doubt, served as very efficient fortifications, and even

now some of them are still in use as storehouses, and for other purposes, as, for instance, at Brantôme, where there is an old chapel cut in the solid rock. Apart from the scientific interest, it was impossible not to enjoy the beauty of the scene which passed before our eyes as we dropped down the Vezére. As the river visited sometimes one side of its valley, sometimes the other, so we had at one moment rich meadow-lands on each side, or found ourselves close to the perpendicular and almost overhanging cliff. Here and there we came upon some picturesque old castle, and though the trees were not in full leaf, the rocks were in many places green with box and ivy and evergreen oak, which harmonized well with the rich yellow brown of the stone itself.

But to return to the bone-caves. Remains of the cave-bear have been found at the Pey de l'Azé, of the cave-hyæna at Le Moustier, and separated plates of elephant molars have occurred at Le Moustier and at Laugerie, accompanied at the latter place by a piece of a pelvis. As regards the two first species, MM. Christy and Lartet regard them as probably belonging to an earlier period than the human remains found in the same caves. The presence of the pelvis has been regarded as an evidence of the contemporaneity of the mammoth with the reindeer hunters of Laugerie, and it is certainly difficult to see why they should have brought a fossil-bone into their cave, more especially as the bones of elephants, from the looseness of their texture, are not well adapted for implements. Still MM. Christy and Lartet do not commit themselves to any opinion, having, as they say, laid down "une loi de ne procéder dans nos inductions que par évidences incontestables."

As regards the *Felis spelæa*, a metacarpal bone belonging probably to this species, and bearing marks of knives, was found in the cave of Les Eyzies.

Still, so far as the positive zoological evidence is concerned, the antiquity of the human remains found in these grottoes rests mainly on the presence of the reindeer, as regards which the evidence is conclusive. The bones of this species are all broken open for the marrow; many of them bear the marks of knives, and at Les Eyzies a vertebra was found which had been pierced by a flint flake. MM. Christy and Lartet are quite satisfied that this bone must have been fresh when it was thus transfixed. Moreover, as we shall presently see, there is still more conclusive evidence that man and the reindeer were contemporaneous in this locality.

But in its negative aspect the zoological evidence is also very instructive. No remains have been found which, in the opinion of MM. Christy and Lartet, can be referred to domestic animals. It is true that bones of the ox and horse occur, but there is no evidence that they belonged to domesticated individuals. Remains of the boar are very rare, and if these animals had been domesticated we might have expected to find them in greater abundance. The sheep and goat are entirely wanting, and, what is still more remarkable, even the dog appears to be absent. At the same time the bones of the horse and reindeer, especially of the latter, are very numerous; but MM. Christy and Lartet do not think that they were domesticated. On the other hand, M. Rütimeyer seems to be of a different opinion*. Of the bones from the cave of Veyrier he has drawn out the following list: Ptarmigan 31 individuals, reindeer 18, ibex 6, horse 5, stag 4, mountain hare 4, marmot 4, chamois 1, wolf 1, bear 1, ox 1, fox 1, and stork 1. He points out that this is decidedly an Alpine fauna, and he asks why, if the reindeer were wild, they did not retire into the high Alps with the bear, the ibex, and the chamois? The condition of the bones, and especially of the horns, will enable us some day

* Revue Savoisienne, 25th April, 1868.

to answer this question, but we have at present no case in which the reindeer and the horse are held in domestication together by the same race, and we must be satisfied to wait for further evidence before the question can be decided.

In the collections made by MM. Christy and Lartet, as well as that of M. le Vicomte de Lastic from Bruniquel, a very large proportion of the animal remains consists of teeth, lower jaws, and horns. Other bones do indeed occur, but they form a small fraction of the whole. Yet we cannot attribute this to the presence of dogs, partly because no remains of this species have yet been discovered, partly because the bones which remain have not been gnawed, but principally because dogs eat only certain bones and parts of bones, as a general rule selecting the spongy portions, and rejecting the solid shafts.

Mr. Galton has pointed out that some of the savage tribes of Africa, not content with the flesh of the animals which they kill, pound up also the bones in mortars, and then suck out the animal juices contained in them. So also, according to Leems, the Danish Laplanders used to break up with a mallet all the bones which contained any fat or marrow, and then boil them until all the fat was extracted*. The Esquimaux also mash up the bones for the sake of the marrow contained in them†. Some of the ancient stone hammers and mortars were no doubt used for this purpose, and the proportions of the different bones afford us, I think, indirect evidence that a similar custom prevailed among the ancient inhabitants of Southern France.

Passing on now to the flint implements found in these caves, we must first call attention to their marvellous abundance. Without any exaggeration they may be said to be

* Account of Danish Lapland, by Leems, Copenhagen, 1767. Translated in Pinkerton's Voyages, vol. i. p. 396.

† Hall, Life with the Esquimaux, vol. ii. pp. 147. 176.

innumerable. Of course this adds greatly to the value of the conclusions; nor need it surprise us, because flint is so brittle, that implements made of it must have been easily broken, and, in that case, the fragments would be thrown away as useless; especially in a chalk district, where the supply of flint would, of course, be practically inexhaustible. Many implements, no doubt, would be left unfinished, having been rendered useless, either by some misdirected blow, or some flaw in the flint. Moreover, we should naturally expect that, in a bone-breccia of this nature, the flint implements would be relatively more abundant than in a Kjökkenmödding. Each oyster furnishes but a single mouthful, so that the edible portions evidently form a greater proportion of the whole in the mammalia than in the mollusca. The Kjökkenmöddings, therefore, would grow, *cæteris paribus*, more rapidly than the bone-breccia, and supposing the flint implements to be equally numerous in both cases, they would, of course, be more sparingly distributed in the former, than in the latter.

The principal objects of stone found in the bone-caves which we are now considering, are flakes, both simple and worked, scrapers, cores, awls, lance-heads, cutters, hammers, and mortar-stones.

The simple and worked flakes are, of course, very numerous, but they do not call for any special observations. They present the usual varieties of size and form.

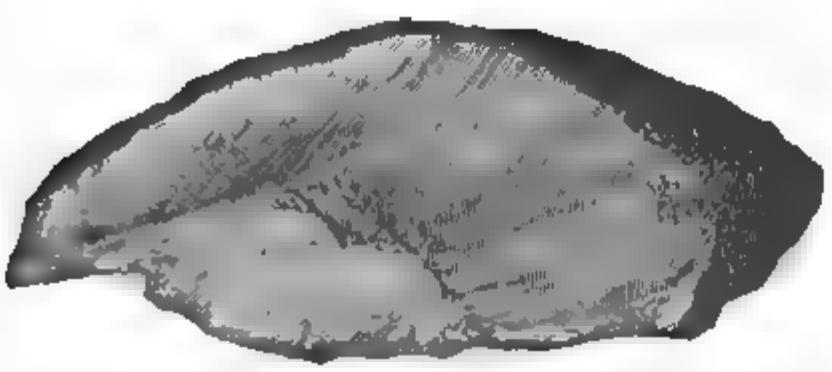
Though less numerous than the flakes, the scrapers* are still very abundant. On the whole they seem to me longer and narrower than the usual Danish type. Some of them were probably intended to be used in the hand, as both ends are fashioned for scraping. These may be called double-scrapers. Others were apparently fixed in handles, as the end opposite to the scraper is broken, sometimes on one side,

* See ante, pp. 96, 97.

sometimes on both, so as to form a tapering extremity, which may have been fixed in a handle either of wood, bone, or horn. Many of the flakes are also nipped off at one end, in the same manner. Perhaps, as no trace of such a handle has yet been discovered by MM. Christy and Lartet, wood was the material used for this purpose.

Of course, where there was a manufactory of flint flakes, the cores or nuclei, from which they were struck, must also be present. I was, however, astonished at the number of them in these caves; during my short visit, I myself picked out more than ninety.

Fig. 181.



Flint Implement.

Awls and saws are very much less frequent, but some few good specimens have been found. At some of the stations, curious flat implements (fig. 181) are met with. From the constancy of their form, which, moreover, is somewhat peculiar, we may safely infer that they were applied to some definite purpose. For hammers, the reindeer hunters seem to have used round stones, a good many of which occur in the caves, and which bear unmistakable marks of the purpose to which they were applied. Some of them, however, may have served also as heaters. The North American Indians, the Esquimaux, and some other savages, having no pottery, but only wooden vessels, which could not be put on the fire, used to heat stones, and then place them in the water which they wished to boil. Many of the stones

found in these caverns appear to have been used in this

Fig. 182.

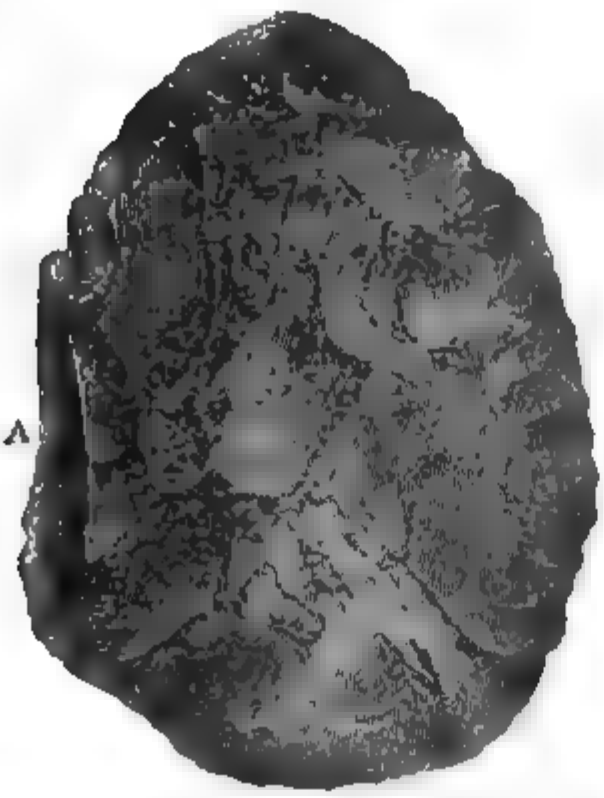
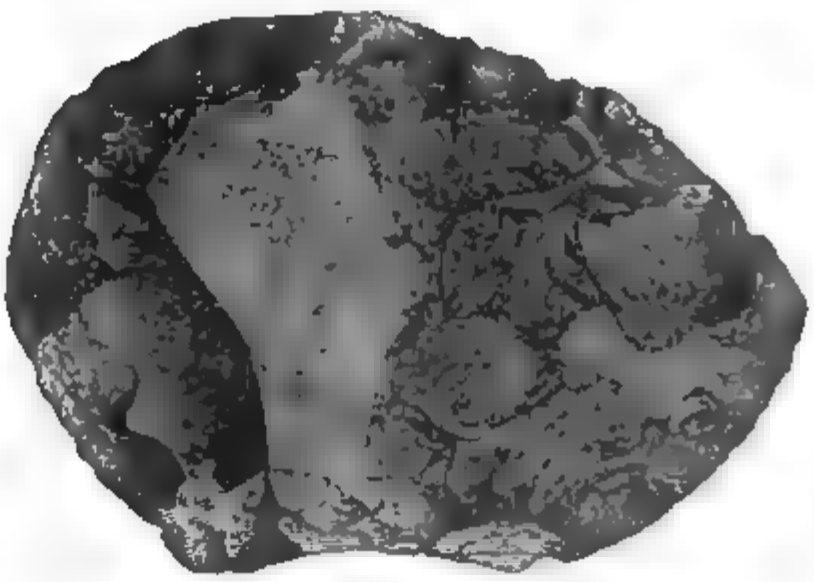


Fig 183.

Fig. 184.



Flint Implement from Le Moustier.

These, the commonest sorts of flint implements, are found indiscriminately in all the grottoes, but there are some other types which appear to be less generally distributed. Thus, at Laugerie and Badegoule, fragments of leaf-shaped lance-

heads, almost as well worked as some of those from Denmark, are far from uncommon. If, therefore, we were to attempt any classification of the grottoes, according to the periods of their occupation, we might be disposed to refer these to a somewhat later period than most of the others. On the contrary, to judge from the flint implements, the station at Le Moustier would be the most ancient. Though it would perhaps be premature to attempt any such classification, there can be no doubt that Le Moustier presents some types not yet found in the other caves, and resembling in some respects those of the drift.

One of these peculiar forms has one side left unchipped, and apparently intended to be held in the hand, while the other has a cutting edge, produced by a number of small blows. Some of these instruments are of large size, and they are supposed by MM. Christy and Lartet to have been used for cutting wood, and perhaps also the large bones of mammalia. Another very interesting type is figured on p. 330 (figs. 182-4). This specimen is worked on both sides, but more frequently one of them is left flat. MM. Christy and Lartet regard this type as identical with the "lance-head" implements found in the drift. I cannot altogether agree with them in this comparison. Not only are the Le Moustier specimens smaller, but the workmanship is different, being much less bold. Moreover, the flat surface (A) is no individual peculiarity. It is very frequently, not to say generally, present, and occurs also on the similar implement found by Mr. Boyd Dawkins in the hyæna-den at Wokey Hole, and figured by him in the Geological Journal, May, 1862, No. 70, p. 119. This very interesting type seems rather to be derived from the "cutters" above described, in which case its resemblance to the drift forms would be accidental and insignificant. MM. Christy and Lartet, indeed, call the implements of this type "lance-heads," but it may

well be doubted whether they were intended for use in this manner, though there are specimens at Le Moustier which have all the appearance of having been intended for this purpose. On the whole, then, although these Le Moustier types are of great interest, we must pause before we regard them as belonging to the drift forms.

Doubtless, among the immense variety of forms presented by the flint implements from these caves, further study will distinguish other types, and we may fairly hope that it will throw more light on the purposes for which they were designed. No polished implements have yet been found in any of these caverns. Yet the collection made by the late M. Mourcin, in the neighbourhood of Perigueux, contains, among 5025 objects of stone, no less than 3002 polished axes, of which, however, many are imperfect.

The station at Moustier has not as yet produced any implements made of bone, but a good many have been obtained from the other caves. "They consist of square chisel-shaped implements; round, sharply-pointed, awl-like tools, some of which also may have served as the spike of a fish-hook; harpoon-shaped lance-heads; plain or barbed arrow-heads with many and double barbs, cut with wonderful vigour; and lastly, eyed needles of compact bone finely pointed, polished, and drilled with round eyes, so small and regular that some of the most assured and acute believers in all the other findings might well doubt whether they could indeed have been drilled with stone, until their repetition by the hand of that practical and conscientious observer, Monsieur Lartet, by the very stone implements found with them, has dispelled their honest doubts*." Moreover, we must remember that the New Zealanders were able with their stone tools to drill holes even through glass†.

So far, then (with the exception, perhaps, of the well-

* Christy, Trans. Ethn. Soc., N. S. vol. iii. † Cook's First Voy. p. 464.

worked lance-heads of Laugerie and Badegoule), all the evidence we have yet obtained from these caves points to a very primitive period, earlier even than that of the first Swiss lake-villages, or Danish shell-mounds. No fragments of metal or pottery have yet been found which can be referred with confidence to the Reindeer period.

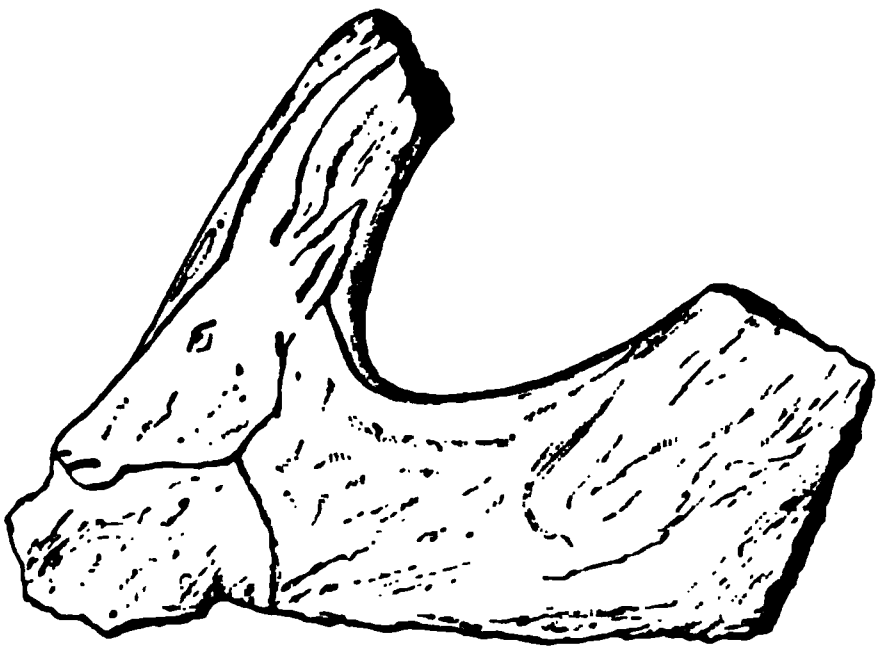
But there is one class of objects in these caves which, taken alone, would have led us to a very different conclusion. No representation, however rude, of any animal has yet been

Fig. 185.

Drawing of a Fish.

found in any of the Danish shell-mounds, or the Stone-age lake-villages. Even on objects of the Bronze Age, they are so rare, that it is doubtful whether a single well authenticated instance could be produced. Yet, in these archaic bone-caves, many very fair sketches have been found, scratched on bone or stone with a sharp point, probably of a flint implement. In some cases there is even an attempt at shading. In the Annales des Sciences Naturelles*, M. Lartet had already made known to us some rude drawings found in the Cave of Savigné, and in his last memoir he has described and figured some more objects of a similar character.

Fig. 186.



Drawing of an Ibex.

In the Dordogne caves also, several of these remarkable

* Ann. des Sc. Nat., 1861, vol. xv.

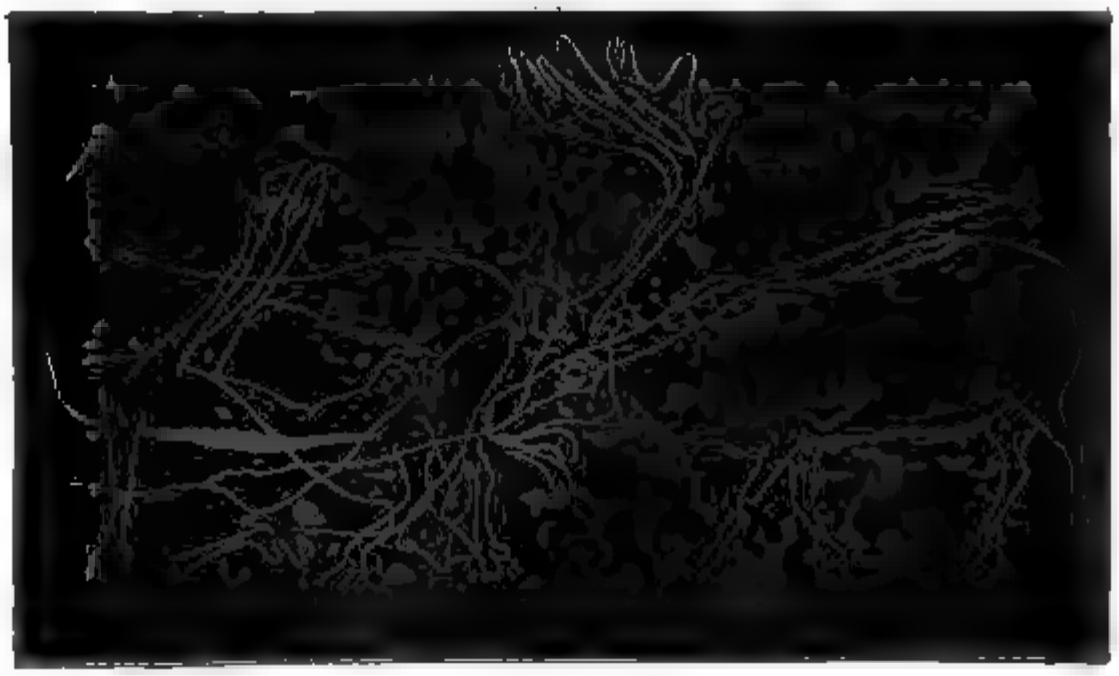
drawings have been discovered, under circumstances which seem to guarantee their authenticity. Fig. 185 represents a cylindrical piece of reindeer's horn, found at La Madelaine, and on which are carved two outlines of fishes, one on each side. Fig. 186 is the piece of the palm of a reindeer's horn, on which is represented the head and chest of an ibex. Fig. 187 represents a very curious group, consisting of a snake,

Fig. 187.

Group of Figures.

or rather eel, a human figure, and two horses' heads. Fig. 188 is a spirited group of reindeer, and pl. 2 is considered to represent a mammoth; it was found at La Madelaine, and

Fig. 188.



Group of Reindeer.

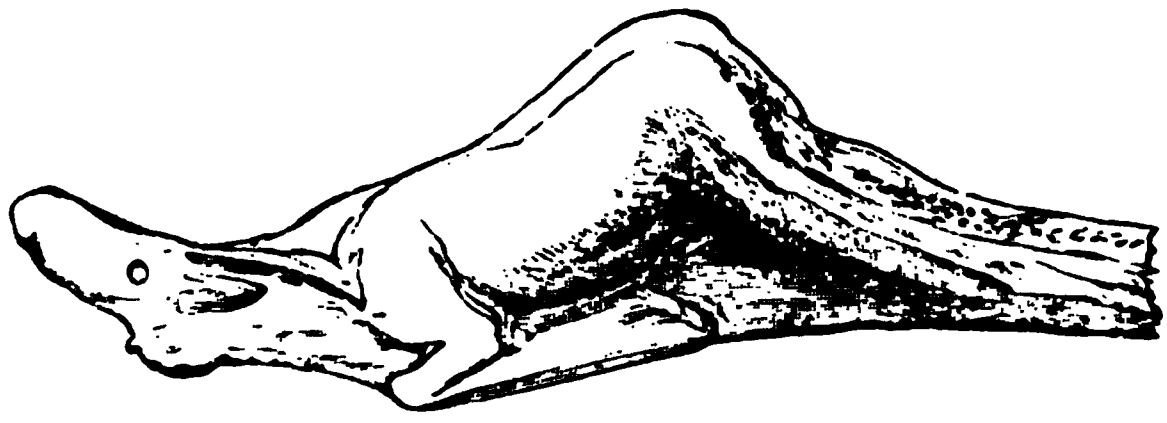
the engraving was for some time unnoticed, as it is rather faint and obscured by numerous scratches. It is on a piece

to face page 32

of a mammoth's tusk, and indications of long hair will readily be perceived.

Another interesting specimen is a poniard, cut out of a reindeer's horn (fig. 189). The artist has ingeniously adapted the position of the animal to the necessities of the case. The horns are thrown back on the neck, the fore-legs are doubled up under the belly, and the hind-legs are stretched out along the blade. Unfortunately the poniard seems to have been thrown away before it was quite finished, but several of the details indicate that the animal was intended for a reindeer. Although it is natural to feel some surprise at finding these works of art, still there are instances among recent savages of a certain skill in drawing and sculpture being accompanied by an entire ignorance of metallurgy. This is particularly the case with the Esquimaux, some of whose drawings will be given in a future chapter.

FIG. 189.



Handle of a Poniard.

In considering the probable condition of these ancient Cave-men, we must give them full credit for their love of art, such as it was; while, on the other hand, the want of metal, of polished flint implements, and even of pottery*; the ignorance of agriculture, and the apparent absence of all domestic animals, including even the dog, certainly imply a very low state of civilization, and a very considerable antiquity.

* Pottery is, however, very rare in the remains of the Irish Crannoges, and is not by any means abundant in the Danish shell-mounds.

There is also evidence that a considerable change of climate must have taken place. The reindeer is the most abundant animal, and evidently formed the principal article of food, while we know that this species is now confined to arctic climates, and could not exist in the south of France. Again, the ibex and the chamois, both of which are now restricted to the snowy summits of the Alps and Pyrenees, and a species of spermophilus, also point to the same conclusion. The presence of the two former species in some of the Swiss lake-dwellings is not equally significant, because they are in the neighbourhood of high mountains, while the highest hills of the Dordogne do not reach to an altitude of much more than 800 feet.

Another very interesting species recently determined by M. Lartet, is the Antilope Saïgo of Pallas, which now abounds on the Steppes of North Eastern Europe and Western Asia, in the plains of the Dnieper and the Volga, round the shores of the Caspian, and as far as the Altai Mountains. Mr. Christy tells us that the northern plains of Poland, and the Valley of the Dnieper, are the southern limits of this species at the present day.

Again, the accumulation of animal remains in these caves is itself, as Mr. Christy has ingeniously suggested, a good evidence of change in the climate. We know that the Esquimaux at present allow a similar deposit to take place in their dwellings, but this can only be done in Arctic regions; in such a climate as that now existing in the south of France, such an accumulation would, except of course in the depth of winter, soon become intolerably offensive.

So far then as the present evidence is concerned, it appears to indicate a race of men living almost as some of the Esquimaux do now, and as the Laplanders did a few hundred years ago; and a period intermediate between that of the Polished Stone implements and of the great extinct mam-

malia: apparently also somewhat more ancient than that of the shell-mound builders of Denmark. But if these Cave-men shall eventually be shown to have been contemporaneous with the cave-tiger, the cave-bear, the cave-hyæna, and the mammoth, remains of which have been found in doubtful association with them, then, indeed, they must be referred to an even more remote period.

As regards the Cave-men themselves, we have, unfortunately, but very little information. For, although fragmentary human bones have been frequently found, there are, as yet, very few cases on record in which the caves have furnished us with skulls in such a condition as to allow of restoration. It is, however, remarkable that these few differ greatly among themselves. Some are dolichocephalic or long-headed, others brachycephalic or shortheaded. One of the most interesting, that discovered by Dr. Schmerling in the cave of Engis, near Liége (figs. 190, 191), might have been that of a modern European, so far at least as form is concerned. "There is no mark of degradation about any part of its structure. It is, in fact, a fair average human skull, which might have belonged to a philosopher, or might have contained the thoughtless brains of a savage*." Very different is the case with the celebrated skull, found in a limestone cave in the Neanderthal, near Hochdal, between Düsseldorf and Elberfeld. This remarkable specimen was first described by Schaafhausen†, and "under whatever aspect," says Prof. Huxley‡, "we view this cranium, whether we regard its vertical depression, the enormous thickness of its supraciliary ridges, its sloping occiput, or its long and straight squamosal suture, we meet with ape-like characters, stamping it as the most pithecoid of human crania yet discovered." It has been suggested that this Neanderthal skull may have been that of

* Huxley, Man's Place in Nature, p. 156.

† Muller's Archiv., 1858. Nat. Hist. Rev., 1861. ‡ l. c. p. 156.

an idiot. There is not, however, any sufficient reason for this hypothesis; and though the shape of the skull is so remarkable, the brain appears to have been of considerable size, and, indeed, is estimated by Professor Huxley at about seventy-five cubic inches, which is the average capacity of the Polynesian and Hottentot skulls. It must, however, be admitted that though the antiquity of this skull is no doubt great, there is no satisfactory proof that it belonged to the period of the extinct Mammalia. Moreover, as Mr. Busk pointed out*, and as

Fig. 190.

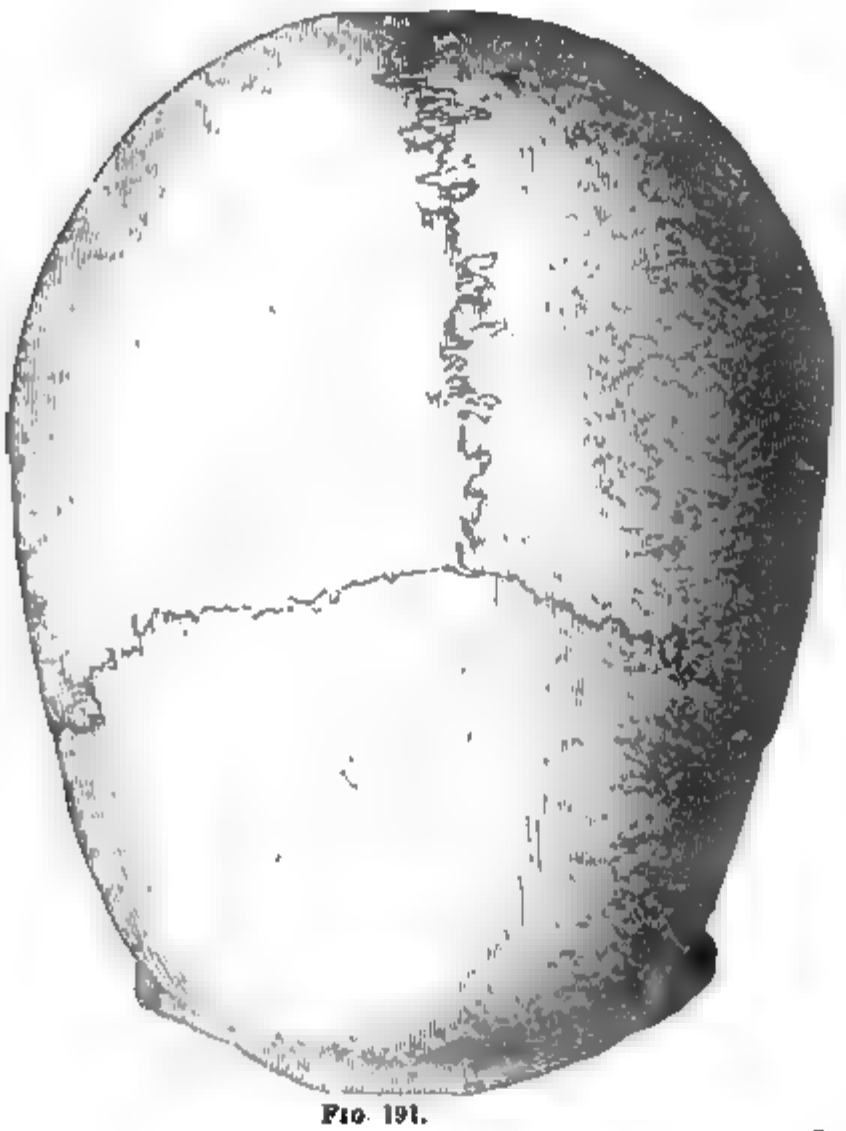
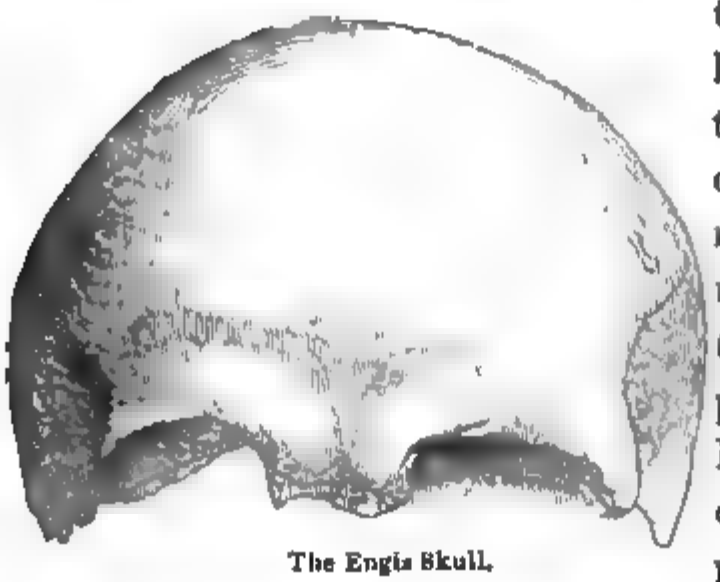


Fig. 191.



The Engis Skull.

* Nat. Hist. Rev., 1861, p. 172.

FIG. 192.

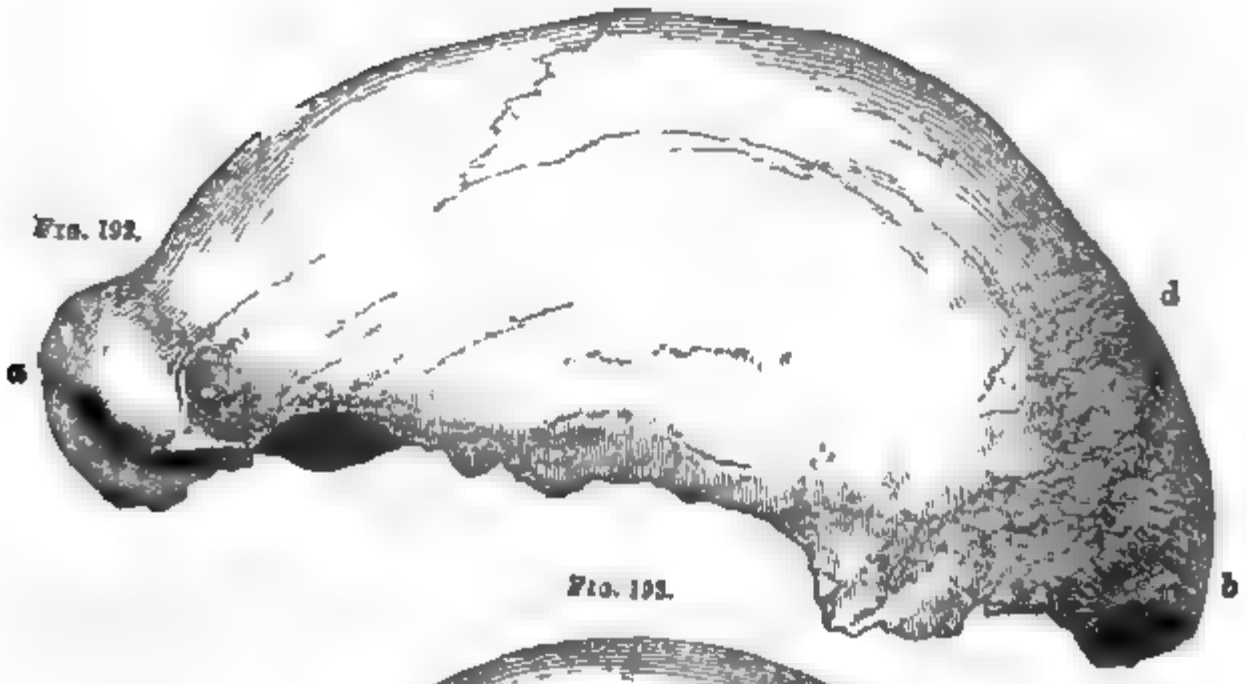


FIG. 193.

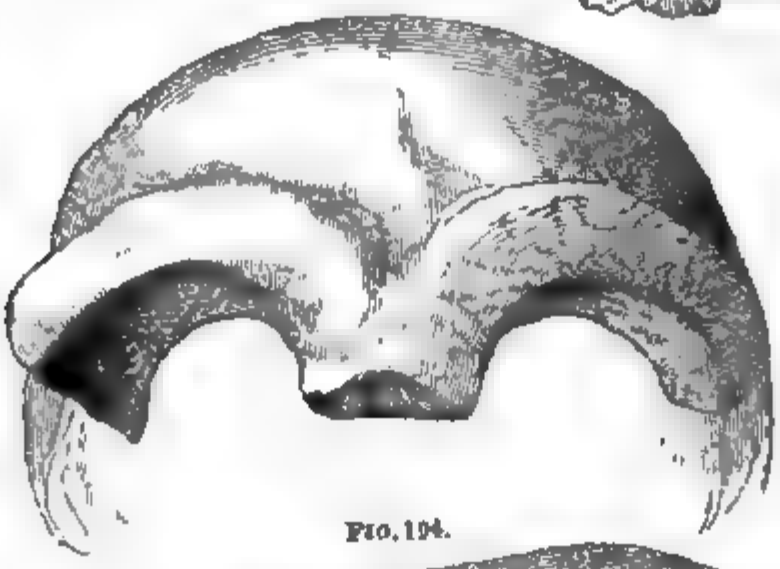


FIG. 194.

The Neanderthal Skull.

Dr. Barnard Davis maintains, "we have yet to determine whe ther the conformation in question be merely an individua peculiarity, or a typical character." Recent researches hav brought to light at Cro Magnon*, in the Dordogne, an inter ment which has been referred, though scarcely, perhaps, o sufficient grounds, to the Reindeer period, and which com prises dolichocephalic skulls of a type very different to that o the Belgian caves; and Professor Owen has described a huma skull from Bruniquel, which is oval, rather dolicho- than brachy cephalic, and shows most affinity with the oldest Celtic types It would appear then that, even at this early period, Europ was already occupied by more than one race of man.

Thus, as regards the Engis skull, there seems no reason t doubt that it really belonged to a man who was contempora neous with the mammoth, the cave-bear, and other extinc mammalia; yet it is a perfectly well developed skull, so that as Professor Huxley has well-pointed out, "the first trace of the primordial stock whence man has proceeded need n longer be sought, by those who entertain any form of th doctrine of progressive development, in the newest ter tiaries; but that they may be looked for in an epoch mor distant from the age of the *Elephas primigenius* than that i from us."

If space permitted, I would gladly have referred to othe cave explorations; to those, for instance, of Dr. Regnoli and others in Italy, of the Marquis de Vibraye, M. Garrigou, M. Bourguignet, M. Filhol, and many other archæologists in the south of France, where these researches have been prose- cuted with great energy and success. In fact, a whole volume might be written on the subject, and it is impossible in the limits of a single chapter to do justice to these and other observers.

I trust, however that the evidence brought forward in this

* Reliquiæ Aquitanicæ, part vi.

chapter has been sufficient to prove that the presence, in bone-caves, of ancient implements and human remains, associated with those of extinct mammalia, is no rare or exceptional phenomenon. Nor, if we look at the question from a scientific point of view, is there any thing in this that ought to excite our astonishment. Since the period at which these caves were filled up, the changes which have taken place have resulted rather in the extinction than in the creation of species. The stag, the horse, the boar, the dog, in short, all our existing forms of mammalia, were already in existence; and there would have been in reality more just cause for surprise if man alone had been unrepresented.

CHAPTER XI.

RIVER-DRIFT GRAVEL-BEDS.

WHILE we have been straining our eyes to the East, and eagerly watching excavations in Egypt and Assyria, suddenly a new light has arisen in the midst of us; and the oldest relics of man yet discovered have occurred, not among the ruins of Nineveh or Heliopolis, not on the sandy plains of the Nile or the Euphrates, but in the pleasant valleys of England and France, along the banks of the Seine and the Somme, the Thames and the Waveney.

So unexpected were these discoveries, so irreconcilable with even the greatest antiquity until lately assigned to the human race, that they were long regarded with neglect and suspicion. M. Boucher de Perthes, to whom we are so much indebted for this great step in the history of mankind, observed, as long ago as the year 1841, in some sand containing mammalian remains, at Menchecourt, near Abbeville, a flint, rudely fashioned into a cutting instrument. In the following years other weapons were found under similar circumstances, and especially during the formation of the Champ de Mars at Abbeville, where a large quantity of gravel was moved and many of the so-called "hatchets" were discovered. In the year 1846 M. Boucher de Perthes published his first work on the subject, entitled "De l'Industrie Primitive, ou les Arts et leur Origine." In this he announced that he had found human implements in beds unmistakably

To face page 342.

belonging to the age of the drift. In his "Antiquités Celtiques et Antédiluviennes" (1847), he also gave numerous illustrations of these stone weapons, but unfortunately the figures were rude, and did but scanty justice to the originals. For seven years M. Boucher de Perthes made few converts; he was looked upon as an enthusiast, almost as a madman. At length, in 1853, Dr. Rigollot, till then sceptical, examined for himself the drift beds at the now celebrated St. Acheul, near Amiens, found several weapons, and believed. Still the new creed met with but little favour; prophets are proverbially without honour in their own country, and M. Boucher de Perthes was no exception to the rule. At last, however, the tide turned in his favour. In 1859 Dr. Falconer, passing through Abbeville, examined his collection, and on his return to England called the attention of Mr. Prestwich, Mr. Evans, and other English geologists, to the importance of his discoveries. In consequence, the Valley of the Somme was visited in 1859 and 1860, firstly, by Messrs. Prestwich and Evans, and shortly afterwards by Sir C. Lyell, Sir R. Murchison, Messrs. Busk, Flower, Mylne, Godwin-Austen, and Galton; Professors Henslow, Ramsay, Rogers; Messrs. H. Christy, Rupert Jones, James Wyatt, myself, and other geologists. M. L'Abbé Cochet, therefore, in his "Rapport adressé à Monsieur le Sénateur Préfet de la Seine-Inférieure," does no more than justice to our countrymen, when after a well-merited tribute of praise to M. Boucher de Perthes and Dr. Rigollot, he adds, "Mais ce sont les Géologues Anglais, en tête desquels il faut placer d'abord MM. Prestwich et Evans . . . . qui . . . . ont fini par élever à la dignité de fait scientifique la découverte de M. Boucher de Perthes."

My visit to the Somme Valley was made in company with Mr. Busk, Captain Galton, and Mr. Prestwich, and I communicated the results to the Natural History Review, in an article "On the Evidence of the Antiquity of Man afforded

by the Physical Structure of the Somme Valley *." I have seen no reason to modify the general conclusions contained in that article, of which, indeed, this chapter is in the main a reprint.

We examined carefully not only the flint weapons, but also the beds in which they were found. For such an investigation, indeed, our two countrymen were especially qualified: Mr. Prestwich, from his long study and profound knowledge of the tertiary and quaternary strata; and Mr. Evans, from his intimate acquaintance with the stone implements belonging to what we must now consider as the second, or at least the more recent, Stone period. On their return to England Mr. Prestwich communicated the results of his visit to the Royal Society†, while Mr. Evans described the implements themselves in the Transactions of the Society of Antiquaries ‡.

Soon after his first visit, Mr. Prestwich addressed a communication to the Academy of Sciences, through M. Elie de Beaumont, in which he urged the importance of these discoveries, and expressed a hope that they would stimulate "les géologues de tous les pays à une étude encore plus approfondie des terrains quaternaires." The subject being thus brought prominently before the geologists of Paris, M. Gaudry, well known for his interesting researches in Greece, was sent to examine the weapons themselves, and the localities in which they were found.

M. Gaudry was so fortunate as to find several flint weapons *in situ*, and his report, which entirely confirmed the statements made by M. Boucher de Perthes, led others to visit

* On the Evidence of the Antiquity of Man afforded by the Physical Structure of the Somme Valley. By J. Lubbock, Esq., F.R.S. With Plate vii. Natural History Review, vol. ii.

† On the Occurrence of Flint Implements associated with the Remains of Extinct Species, in Beds of a late Geological Period, May 19, 1859. Phil. Trans. 1860.

‡ Flint Implements in the Drift. Archæologia, 1860-62.

the valley of the Somme, among whom I may mention MM. de Quatrefages, Lartet, Collomb, Hébert, de Verneuil, and G. Pouchet.

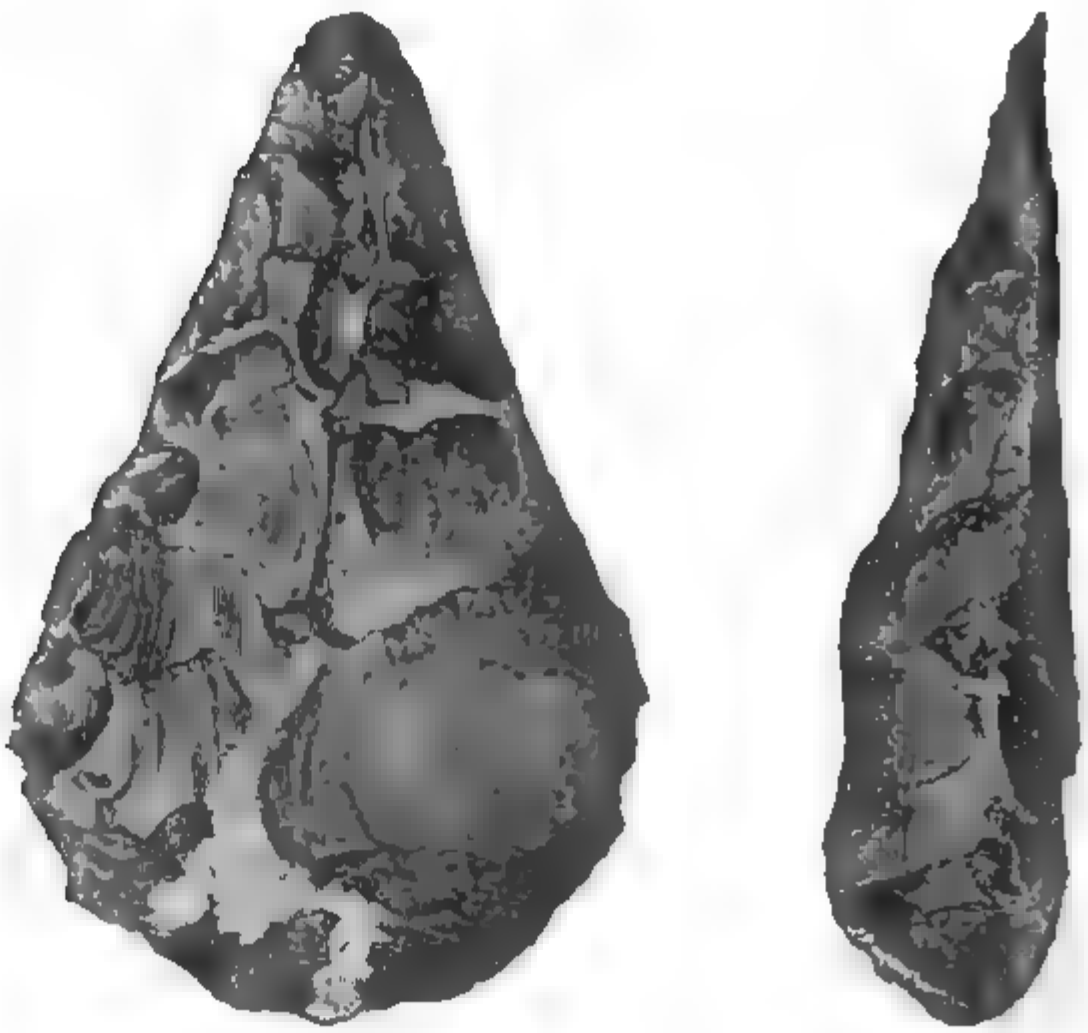
In the "Antiquités Celtiques," M. Boucher de Perthes suggested some gravel-pits near Grenelle at Paris, as being, from their position and appearance, likely places to contain flint implements. M. Gosse shortly afterwards found flint implements in these pits, being the first discovery of this nature in the valley of the Seine, while in that of the Oise, a small hatchet has been found by M. Peigné Delacourt, at Précy, near Creil.

Nor have these discoveries been confined to France. There has long been in the British Museum a rude stone weapon, described as follows:—"No. 246. A British weapon, *found with elephant's tooth*, opposite to black Mary's, near Grayes inn lane. Conyers. It is a large black flint, shaped into the figure of a spear's point." Mr. Evans tells us, moreover, (l. c. p. 22) "that a rude engraving of it illustrates a letter on the Antiquities of London, by Mr. Bagford, dated 1715, printed in Hearne's edition of Leland's Collectanea, vol. i. 6, p. lxiii. From his account it seems to have been found with a *skeleton* of an elephant in the presence of Mr. Conyers." This most interesting weapon agrees exactly with some of those found in the valley of the Somme.

Mr. Evans, on his return from Abbeville, observed in the museum belonging to the Society of Antiquaries, some specimens exactly like those in the collection of M. Boucher de Perthes. On examination, it proved that they had been presented by Mr. Frere, who found them with bones of extinct animals in a gravel-pit at Hoxne in Suffolk, and had well described and figured them in the Archæologia for the year 1800. This communication is of so much interest that I have thought it desirable to reproduce his figures, reduced one-half (figs. 195–198).

Again, twenty-five years ago, Mr. Whitburn, of Godalming*, while examining the gravel-pits between Guildford and Godalming, remarked a peculiar flint, which he carried away, and has since preserved in his collection. It belongs to the "drift" type, but is very rude. Thus, this peculiar type of flint implement has been actually found in association with the bones of the mammoth on various occasions during

FIG. 195. FIG. 196.



Flint Implement from Hoxne.

nearly a hundred and fifty years! While, however, these instances remarkably corroborate the statements made by M. Boucher de Perthes, they in no way detract from the credit due to that gentleman.

* Prestwich, Geol. Jour. August, 1861.

In addition to the above-mentioned, similar hatchets have been found in various other localities, as for instance by

Fig. 197. Fig. 198.

Flint Implement from Hoxne.

Mr. Warren, at Icklingham; by Mr. Leech, near Herne Bay; by Mr. Evans himself at Abbot's Langley; by Mr. Norman

at Green Street Green, in Kent; by Messrs. Whitaker and Hughes, near Dartford; in fact, similar discoveries have been made in most of our south-eastern counties.

In the gravel near Bedford, again associated with the remains of the mammoth, rhinoceros, hippopotamus, ox, horse, and deer, Mr. Wyatt* has found flint implements resembling both of the two principal types found at Abbeville and Amiens. This case is very interesting, because it shows that the drift flint hatchets are subsequent to the boulder clay; the Bedford valley being cut through hills capped by a deposit of that period. At Hoxne, also, the bed containing flint implements appears actually to rest on the boulder clay.

The number of localities on the Continent in which stone implements have been obtained from beds of the Quaternary period has also largely increased.

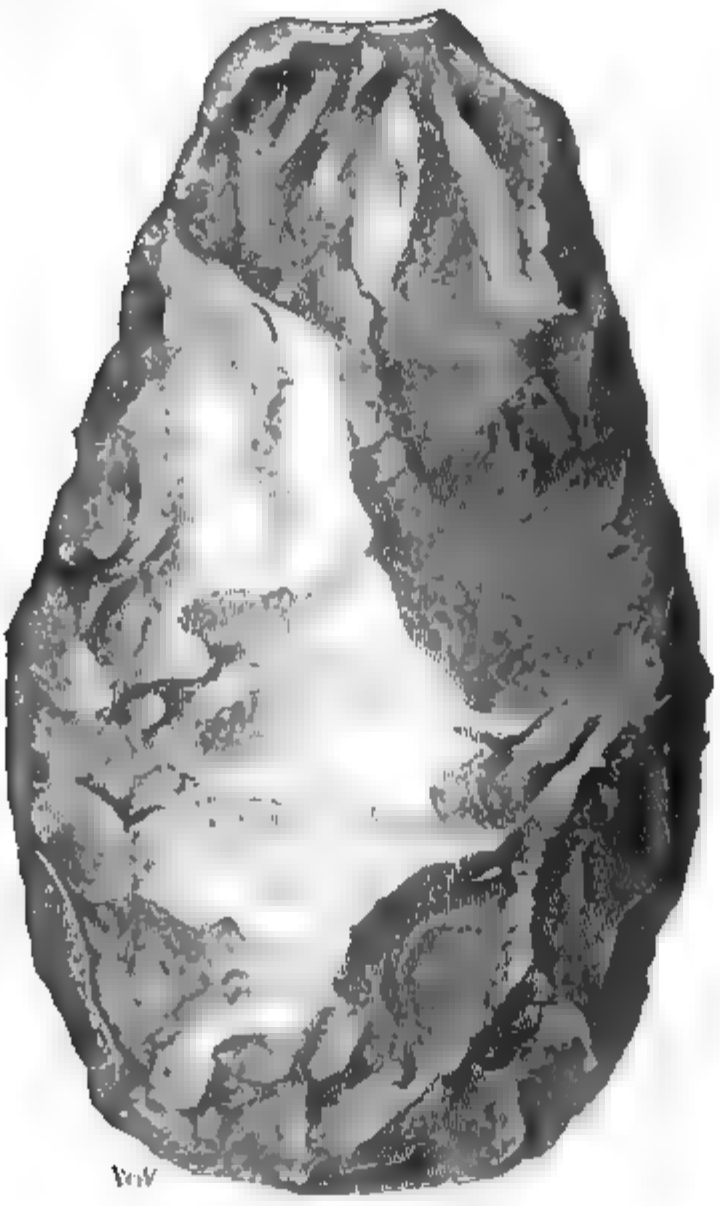
Stone implements more or less resembling those characteristic of the Palæolithic Age, have also been found in other parts of the world, as for instance, in Assyria, North America, and Hindostan; though except in the latter case we have no reason for attributing to them any very great antiquity. The Indian specimens have been described by Mr. Bruce Foote†: they were found in the Madras and North Arcot districts, and are of quartzite, and in several cases were found by Messrs. Foote and King *in situ* at depths of from 3 to 10 feet. The specimens figured (figs. 199, 200) will show how closely they resemble our European specimens, and it is interesting that in the words of Mr. Foote, "the area, over which the lateritic formations were spread, has undergone, as already stated, great changes since their

* Flint Implements in the Drift. By J. Wyatt. Bedfordshire Architectural and Archæological Society, 1862.

† On the Occurrence of Stone implements in lateritic formations in various parts of the Madras and North Arcot Districts. By R. Bruce Foote.

deposition. A great part of the formation has been removed by denudation, and deep valleys cut into them, now occupied by the alluvium of various rivers*." Unfortunately no bones have yet been found in these beds. Worked agates have also been found in the deposits of the Nerbudda, and

FIG. 199.



Stone Implement from Madras.

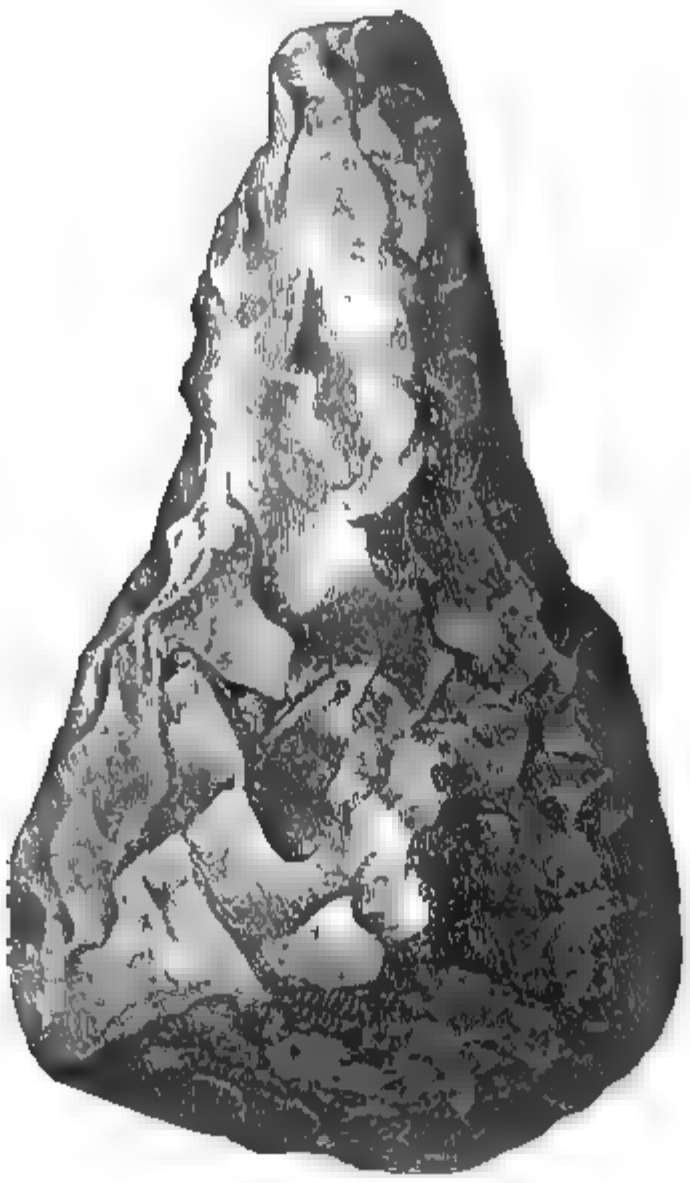
in the bone-beds of the upper Godavery, "which are, there is little doubt, the same age as those of the Nerbudda, which contain *Elephas insignis*, *E. Namadicus*, *Hippopotamus palæindicus*, *Bos palæindicus*, and *B. Namadicus*†."

* l. c. p. 28.

† Blandford, Geol. Magazine, February, 1866.

The specimens found in the Somme Valley are, as I shall endeavour to show, connected with the present river system, and the same was the case with those first discovered in England. Further researches, however, have brought to light cases in which flint implements have been found in beds

Fig. 200.



Stone Implement from Madras.

of gravel having no relation to the existing river systems. Mr. Flower has called attention to several of these in our eastern counties, and I have had the advantage of visiting them with him. The Shrub Hill gravel-bed, for instance, is a low mound of gravel of about fifteen feet thick, rising in the middle of the fen near Ely, and surrounded on all sides

by a low flat district. Yet in this bed, and especially in the lowest part of it, numerous flint implements of the palæolithic types have been discovered.

Some of the Hampshire specimens also have been found *in situ*, in a mass of drift gravel which covers the Tertiary beds, and is intersected by all the streams which now run into the Southampton water. This mass of drift gravel, moreover, is not confined to the mainland, but caps also the Foreland Cliffs on the east of the Isle of Wight, where an oval flint implement has recently been discovered by Mr. T. Codrington. As Mr. Evans has pointed out, we seem, in this discovery, to have clear evidence that man existed in this country before the Southampton water was formed, or the Isle of Wight was separated from the mainland, and we may therefore regard these implements as among the most striking proofs of Man's Antiquity, which they carry back to a period far more ancient than that which had previously been assigned to him.

We cannot therefore wonder that the statement by Mr. Frere has been distrusted for more than half a century; that the weapon found by Mr. Conyers has lain unnoticed for more than double that time; that the discoveries by M. Boucher de Perthes have been ignored for fifteen years; that the numerous cases in which caves have contained the remains of men together with those of extinct animals have been suppressed or explained away: these facts show how deeply rooted was the conviction that man belonged altogether to a more recent order of things; and whatever other accusation may be brought against them, geologists can at least not be said to have hastily accepted the theory of the co-existence of the human race with the now extinct Pachydermata of Western Europe.

Though, however, geologists are now almost unanimous as to the great antiquity of these curious weapons, still, it is

not necessary that they should be received as judges; I only propose to summon them as witnesses.

The questions to be decided may be stated as follows:—

1st. Are the so-called flint implements of human workmanship?

2ndly. Are the flint implements of the same age as the beds in which they are found, and the bones of the extinct animals with which they occur?

3rdly. What are the conditions under which these beds were deposited? And how far are we justified in imputing to them a great antiquity?

To the first two of these questions an affirmative answer would be given by almost every geologist who has paid any special attention to the subject. Fortunately, however, for the sake of the discussion, there is one exception. Blackwood's Magazine for October, 1860, contains an able article in which the last two questions are maintained to be still unanswered, and in which, therefore, a verdict of "Not Proven" is demanded. Not, indeed, that there is any difference of opinion as to the weapons themselves. "They bear," admits the writer (p. 438), "unmistakably the indications of having been shaped by the skill of man." "For more than twenty years," says another competent witness—Prof. Ramsay—"I have daily handled stones, whether fashioned by nature or art, and the flint hatchets of Amiens and Abbeville seem to me as clearly works of art as any Sheffield whittle*." But best of all, an hour or two spent in examining the forms of ordinary flint gravel, would, I am sure, convince any man that these stones, rude though they be, were undeniably fashioned by the hand of man.

Still it might be supposed that they were forgeries made by ingenious workmen to entrap unwary geologists. They have, however, been actually found by Messrs. Boucher de

* Athenæum, July 16, 1859.

Perthes, Henslow, Christy, Flower, Wyatt, Evans, myself, and others, under circumstances which preclude all idea of deception. One seen, though not found by himself *in situ*, is thus described by Mr. Prestwich: "it was lying flat in the gravel at a depth of seventeen feet from the original surface, and six and a half feet from the chalk. One side slightly projected. The gravel around was undisturbed, and presented its usual perpendicular face. I carefully examined the specimen, and saw no reason to doubt that it was in its natural position, for the gravel is generally so loose, that a blow with a pick disturbs and brings it down for some way round; and the matrix is too little adhesive to admit of its being built up again as before with the same materials. . . . . I found also afterwards, on taking out the flint, that it was the thinnest side which projected, the other side being less finished and much thicker*." But evidence of this nature, though interesting, is unnecessary; *the flints speak for themselves*. Many of them are more or less rolled or worn at the edges. Those which have lain in siliceous or chalky sands are more or less polished and have a beautiful glossiness of surface, very unlike that of a newly-broken flint. In ochreous sand, "especially if argillaceous, they are stained yellow, whilst in ferruginous sands and clays they assume a brown colour," and in some beds they become white and porcellaneous. In many cases, moreover, they have incrustations of carbonate of lime and small dendritic markings. The freshly-broken chalk flints, on the contrary, are of a dull black or leaden colour; they vary a little in darkness but not in colour, and do not present white or yellow faces; moreover, the new surfaces are dead, and want the glossiness of those which have been long exposed. It is almost unnecessary to say, that they have no dendritic markings, nor are they encrusted by carbonate of lime.

* Phil. Trans. 1860, p. 292.

Now the forgeries—for there *are* forgeries—differ from the genuine implements by just those characters which distinguish newly-broken flints from those which have lain long in sand or gravel, or exposed to atmospheric agencies. They are black; never white or yellow; their surfaces are not glossy, but dull and lustreless, and they have no dendritic markings or incrustations. Nor would it be possible for an ingenious rogue to deceive us by taking a stained flint and fashioning it into a hatchet; because the discoloration of the flint is quite superficial, seldom more than a quarter of an inch in thickness, and follows the outline of the present surface, showing that the change of colour was subsequent to the manufacture; while if such a flint were tampered with, the fraud would be easily detected, as each blow would remove part of the outer coating, and expose the black flint inside, as may be seen in pl. 1, fig. 11.

Moreover, it must be remembered, that when M. Boucher de Perthes' work was published, the weapons therein described were totally unlike any of those familiar to archæologists. Since that time, however, not only have similar implements been found both in England, France, and other countries, but, as already mentioned, it has since come to light that similar weapons were in two cases actually described and figured in England many years ago, and that in both these instances they were found in association with the bones of extinct animals. On this point, therefore, no evidence could be more conclusive.

We may, then, pass on to the second subject, and consider, Whether the Flint implements are as old as the beds in which they occur, and as the remains of extinct mammalia with which they are associated.

It has been suggested by some writers, that though they are really found in the mammaliferous gravel, they may be comparatively recent, and belong really to the Neolithic or

later Stone Age, but have gradually sunk down from above by their own weight, or perhaps have been buried in artificial excavations. There are, however, no cracks or fissures by which the hatchets could have reached their present positions, and the strata are "altogether too compact and immovable to admit of any such insinuation or percolation of surface objects*." Nor could any ancient excavations have been made and filled in again without leaving evident traces of the change. Moreover, we may in this case also appeal to the flint implements themselves, which, as we have already seen, agree in colour and appearance with the gravel in which they occur; and it seems, therefore, only reasonable to infer that they have been subjected to the same influences. Moreover, if they belonged to the later Stone period, and had found their way by any accident into these gravels, then they ought to correspond with the other flint implements of the Stone period. But this is not the case. The flakes, indeed, offer no peculiarities of form. Similar splinters of flint, or obsidian, have been used in the absence of metal by savage tribes in almost all ages and all countries. The other implements, on the contrary, are very characteristic. They are almost always made of flint, whereas many other minerals, such, for instance, as serpentine, jade, clayslate, etc., were used in the later Stone Age. Their forms are also peculiar; some are oval (pl. 1, fig. 11), chipped up to an edge all round, and from two to eight or nine inches in length. A second type is also oval, but somewhat pointed at one end (pl. 1, fig. 10, and figs. 195, 196). Others again (figs. 197, 198) have a more or less heavy butt at one end and are pointed at the other. Mr. Evans regards these† as having served as spear or lance heads. He treats as a mere variety of this type those implements in which the cutting end is rounded off but not pointed. Some of these, however, were evidently

* Blackwood, l. c.

† l. c. 1860, p. 11.

intended to be held in the hand, and probably served a different purpose; they may, I think, fairly be considered as a fourth type, though it must be confessed that all these types run very much into one another, and in any large collection many intermediate forms may be found. The smaller end is, in all cases, the one adapted for cutting, while the reverse is almost invariably the case in the oval celts of the Neolithic Stone Age (figs. 97 and 98).

Again, the flint implements of the drift are never polished or ground, but are always left rough. We may safely estimate that five thousand at least have been already found in the drift gravels of England and France, and of this large number there is not one which shows a trace of polishing or grinding; while we know that the reverse was almost always the case with the celts of the later Stone period. It is true that the latter is not an invariable rule; thus, in Denmark there are two forms of so-called "axes" which are left rough —namely, the small triangular axes of the Kjökkenmöddings (figs. 108–110) which are invariably so, and the large square-sided axes with which this is often the case. But these two forms of implements resemble in no other way those which are found in the drift, and could not for a moment be mistaken for them. It is not going too far to say, that there is not a single well-authenticated instance of a "celt" being found in the drift, or of an implement of the drift type being discovered either in a tumulus, or associated with remains of the later Stone Age.

It is useless to speculate upon the use made of these rude yet venerable weapons. Almost as well might we ask, to what use could they *not* be applied? Numerous and specialized as are our modern instruments, who could describe the exact use of a knife? But the primitive savage had no such choice of weapons; we see before us perhaps the whole contents of his workshop; and with these implements,

rude as they seem to us, he may have cut down trees, scooped them out into canoes, grubbed up roots, attacked his enemies, killed and cut up his food, made holes through the ice in winter, prepared firewood, etc.

The almost entire absence of human bones, which has appeared to some so inexplicable as to throw a doubt on the whole question, is, on consideration, less extraordinary than it might at first sight appear to be. If, for instance, we turn to other remains of human settlements, we shall find a repetition of the same phenomenon. Thus in the Danish shell-mounds, where worked flints are by far more plentiful than in the St. Acheul gravel, human bones are of the greatest rarity, only one piece in fact having ever been found. At that period, as in the Drift age, mankind lived by hunting and fishing, and could not, therefore, be very numerous. In the era, however, of the Swiss Lake-habitations, the case was different. M. Troyon estimates the population of the "Pfahlbauten" during the Stone Age at about 32,000; in the Bronze era, 42,000. On these calculations, indeed, even their ingenious author would not probably place much reliance; still the number of the Lake-villages already known is very considerable; in four of the Swiss lakes only, more than seventy have been discovered, and some of them were of great extent: Wangen, for instance, being, according to M. Lohle, supported on more than 50,000 piles. Yet, if we exclude a few bones of children, human remains have been obtained from these settlements in six cases only. The number of flint implements obtained hitherto from the drift of the Somme valley probably does not much exceed 5000*; the settlement at Concise alone (Lake of Neuchatel) has supplied about 24,000, and yet has

* One of the tumuli in the Mississippi Valley is estimated to have alone contained nearly four thousand stone implements. This, however, must have been a very exceptional case.

not produced a single human skeleton*. Probably this absence of bones is in part attributable to the habit of burying or burning; the instinct of man has long been in most cases to bury his dead out of his sight. Still, so far as the drift of St. Acheul is concerned, the difficulty will altogether disappear, if we remember that *no trace has ever yet been found of any animal as small as a man*. Even of the elephant and rhinoceros, the ox, horse, and stag†, only the larger and more solid bones remain; every vestige of the smaller ones has perished. No one supposes that this scanty list fairly represents the mammalian fauna of this time and place. When we find at St. Acheul the remains of the wolf, boar, roedeer, badger, and other animals which existed during the drift period, then, and not till then, we may perhaps begin to wonder at the entire absence of human skeletons.

We must also remember that when man lived on the produce of the chase there must have been a very large number of wild animals to each hunter. Among the Laplanders, 100 reindeer is the smallest number on which a man can subsist, and no one is considered rich who does not possess at least from 300 to 500. But these are domesticated, and a large supply of nourishment is derived from their

* Rapport à la Commission des Musées, October, 1861, p. 16.

† The bones of the stag owe their preservation perhaps to another cause. Prof. Rütimeyer tells us that among the bones from the Pfahlbauten none are in better condition than those of the stag: this is the consequence, he says, of their "dichten Gefüge, ihrer Härte und Sprödigkeit, so wie der grossen Fettlosigkeit," peculiarities which recommended them so strongly to the men of the Stone Age, that they used them in preference to all others, nay, almost exclusively, in the manufacture of those instruments which could be made of bone (Fauna der Pfahlbauten, p. 12). How common the bones of the stag are in quaternary strata, geologists know, and we have here, perhaps, an explanation of the fact. The antler of the reindeer is also preferred at the present day by the Esquimaux in the manufacture of their stone weapons. (Sir E. Belcher, Trans. Ethn. Soc. vol. i. p. 139.)

milk. In the case of wild animals we may safely assume that a much larger number would be necessary. The Hudson's Bay territory is said to comprise about 900,000,000 acres. The number of Indians is estimated at 139,000. Allowing one wild animal to each twenty acres, this would give about 300 animals to each Indian; and, if we consider the greater longevity of man, we must multiply this by six, or even more.

Or again, we may attempt to form an estimate in the following manner. The number of skins received by the Hudson's Bay Company in 1866 amounted to 1,250,000, made up as follows:

Beaver	144,744	
Fox	32,982	
Lynx	68,040	
Marten	92,373	
Mink	73,149	
Musquash	608,396	
Otter	14,376	
Rabbit	105,909	
Bear	6,457	
Racoon	24,860	
Wolf	7,429	
Sundries	63,950	
		1,242,765
The number of Indians is estimated at 139,000, and Hearne states that every one requires at least twenty deerskins for clothes, without counting those required for tent-cloths, bags, etc.; this therefore would give us 139,000 × 20		2,780,000
Carried over		4,022,765

Brought over . . .	4,022,765
But the deerskins are fit for clothes only during 2 months in the year, and as it will be observed that the majority of the animals enumerated above are not fit for food, others must have been killed in sufficient quantities to serve as food for 10 months. Assuming that an Indian requires one every month, which is probably within the mark, we shall again require 139,000 × 10 (the number of months)	1,390,000
Making therefore a total of	5,412,765

And assuming that one animal out of twenty is killed by the Indians, we shall have 108,000,000 to 139,000 Indians, or about 750 animals to each man, besides which, a further allowance must be made as before on account of man's greater longevity. Dr. Rae, who has had so much experience in these matters, has been good enough to look over the above calculation, which he considers fairly estimated, but it has of course no pretensions to accuracy.

Lastly, it may be observed that man is less likely to be drowned by sudden river floods, than is the case with other land mammalia*; and, on the whole, therefore, it is natural that the bones of animals would be far more common in these gravels than those of man.

It must not, however, be supposed that the latter are altogether absent. Without relying on the human lower jaw, stated to have been found in the pit at Moulinguignon, and about which there has been so much discussion and difference of opinion, I may instance the discovery of human remains by M. Bertrand†, at Clichy, in the valley of the Seine.

* See, for instance, Bakie, Exploring Voyage up the Kwora, p. 215.

† Les Mondes, 1869, p. 64.

Among these bones, about the authenticity and antiquity of which there seems to be no doubt, was a skull which has been examined by M. Lartet, and which is decidedly dolichocephalic.

We have as yet but partly answered the second of the two questions with which we started. Even admitting that the flint hatchets are coeval with the gravel in which they occur, it remains to be shown that the bones of the extinct animals belong also to the same period. This was at first doubted by some geologists, who suggested that they might have been washed out of earlier strata.

If, however, these bones belonged to a period earlier than that of the gravel, where, we may ask, are the remains of the animals which did exist at that time? Moreover, the bones, though sometimes much worn and broken, are at others, and even, according to Mr. Prestwich, "as a general rule*, either not rolled at all, or are slightly so." Secondly, these species, and particularly the mammoth and the woolly-haired rhinoceros, are the characteristic and commonest species of these beds, not only in the valley of the Somme, but in all the drift gravels of England and France; while, if they belonged in reality to an earlier period, they would not occur so constantly, and they would be accompanied by other species characteristic of earlier times.

Thirdly, the materials forming the drift gravels of the Somme Valley have all been obtained from the present area of drainage, and there are in this district no older beds from which the remains of these extinct mammalia could possibly have been derived. There are, indeed, outliers of tertiary strata, but the mammalian remains found in those beds belong to other, and much older, species.

Fourthly, as regards the rhinoceros, we have the express testimony of M. Baillon, that on one occasion all the bones

* Phil. Trans. l. c. p. 300.

of a hind-leg were found in their natural positions at Menchecourt, near Abbeville, while the rest of the skeleton was found at a little distance. In this case, therefore, the animal must have been entombed before the ligaments had decayed away.

M. Casciano de Prado has made a very similar discovery in Spain, not far from Madrid. There the section was as follows: First, vegetable soil; then about twenty-five feet of sand and pebbles, under which was a layer of sandy loam, in which during the year 1850, a complete skeleton of the mammoth was discovered. Underneath this stratum was about ten feet of coarse gravel, in which some flint axes, very closely resembling those of Amiens, have been discovered.

Finally, as regards the rhinoceros, M. Lartet assures us* that some of the bones bear the marks of flint implements; nay more than this, he has even satisfied himself, "by comparative trials on homologous portions of existing animals, that incisions, presenting such appearances, could only be made in fresh bones, still retaining their cartilage."

There is, then, no more reason for believing that the bones of these extinct mammalia were washed out of earlier strata into the drift gravels, than for attributing such an origin to the implements themselves; and we may, I think, regard it as well-established, that the mammoth and woolly-haired rhinoceros, as well as the other above-mentioned mammalia, co-existed with the savages who used the rude "drift hatchets," at the time when the gravels of the Somme were being deposited.

The second of the three questions with which we started (p. 342) may therefore be answered in the affirmative.

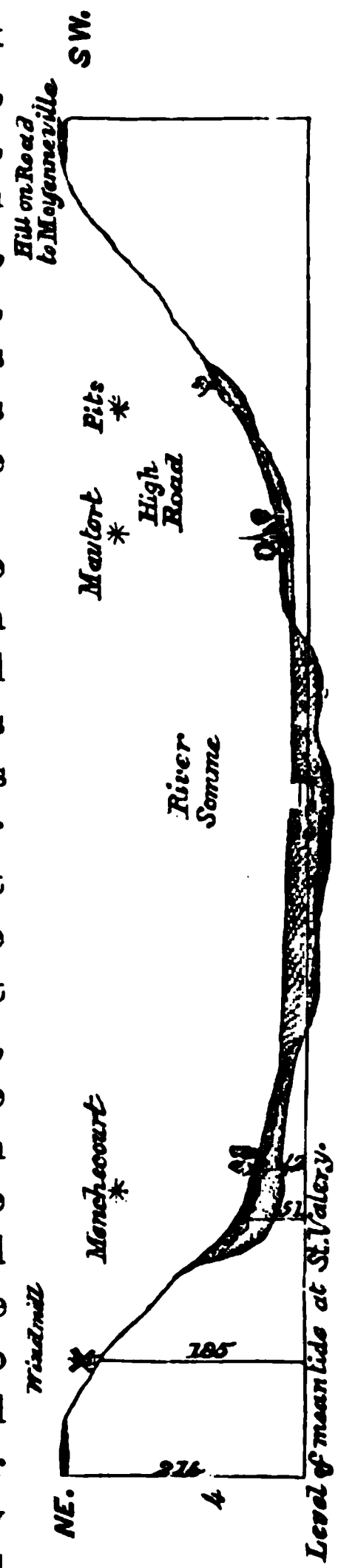
Must we, then, carry man back far into the past, or may we retain our date for the origin of the human race by bringing the extinct animals down to comparatively recent times?

* Geological Journ. vol. xvi. p. 471.

The absence of all tradition of the elephant and rhinoceros in Europe carries us back far indeed in years, but a little way only, when measured by geological standards, and we must therefore solve this question by examining the drift gravels themselves, the materials of which they are composed, and the positions which they occupy, so as to determine, if possible, the conditions under which they were deposed, and the lapse of time which they indicate.

Fig. 201 gives a section across the valley of the Somme at Abbeville, taken from the memoir in the Philosophical Transactions*, by Mr. Prestwich, who has long studied the quaternary beds, and has done more than any other man to render them intelligible. We should find almost the same arrangement and position of the different beds, not only at St. Acheul, but elsewhere along the valley of the Somme, wherever the higher beds of gravel have not been removed by subsequent action of the river. Even at St. Valéry, at the present mouth of the river, I found a bed of gravel at a considerable height above the level of the sea. This would seem to show that at the period of these high-level gravels, the English Channel was narrower than it is at present, as indeed we know to have been the case even in historical times. So early as 1605 our countryman Verstegan pointed that the waves and tides were eating

Fig. 201.



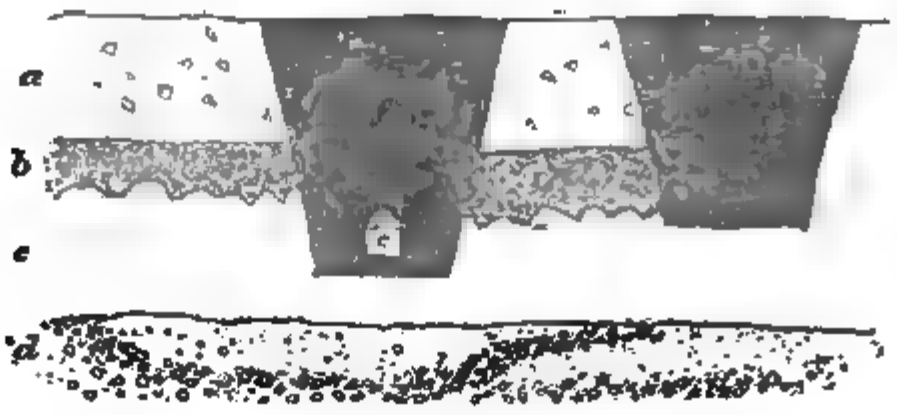
Section across the Valley of the Somme at Abbeville.

* Phil. Trans, 1860.

away our coasts. Sir C. Lyell* gives much information on this subject, and it appears that, even so lately as the reign of Queen Elizabeth, the town of Brighton occupied the site of the present Chain Pier.

Mr. Prestwich has pointed out† that a section, similar to that of the Somme, is presented by the Lark, Waveney, Ouse, etc., while it is well shown also along the banks of the Seine. Probably, indeed, it holds good of most of our rivers, that along the sides of their valleys are patches of old gravels left by the stream at various heights, before they had excavated the channels to their present depth. Mr. Prestwich considers that the beds of sand and gravel can generally be divided into two more or less distinct series, one continuous along the bottom of the valleys and rising little above the water level—these he calls the low-level gravels; the other, which he terms the upper or high-level gravels, occurring in

FIG. 202.



Section at St. Acheul.

detached masses at an elevation of from fifty to two hundred feet above the valley. They seem to me, on the contrary, only the two extremes of a single series, once continuous, but now generally presenting numerous interruptions. A more magnified view of the strata at St. Acheul, near Amiens, is shown in fig 202. The upper layer of vegetable soil having been removed, we have—

* See Principles of Geology, p. 315. † Phil. Trans. 1864.

1. A bed of brick earth (*a*) from four to five feet in thickness, and containing a few angular flints.

2. Below this is a thin layer of angular gravel (*b*), one to two feet in thickness.

3. Still lower is a bed of sandy marl (*c*), five to six feet thick, with land and freshwater shells, which, though very delicate, are in most cases perfect.

4. At the bottom of all these, and immediately overlying the chalk, is the bed of partially rounded gravel (*d*) in which principally the flint implements are found. This layer also contains many well-rolled tertiary pebbles.

In the early Christian period this spot was used as a cemetery: the graves generally descend into the marly sand, and their limits are very distinctly marked, as in fig. 202*f*; an important fact, as showing that the rest of the strata have lain undisturbed for 1500 years. Some of the coffins were of hard chalk (fig. 202 *e*), some of wood, in which latter case the nails and clamps only remain, every particle of wood having perished, without leaving even a stain behind. Passing down the hill towards the river, all these strata are seen to die out, and we find ourselves on the bare chalk; but again at a lower level occurs another bed of gravel, resembling the first, and capped also by the bed of brick earth which is generally known as loëss. This lower bed of gravel is that called by Mr. Prestwich the lower-level gravel.

These strata, therefore, are witnesses; but of what? Are they older than the valley, or the valley than they? are they the result of causes still in operation, or the offspring of cataclysms now, happily, at an end?

If we can show that the present river, somewhat swollen perhaps, owing to the greater extension of forests in ancient times, and by an alteration of climate, has excavated the present valley, and produced the strata above enumerated; then "the suggestion of an antiquity for the human family

so remote as is here implied, in the length of ages required by the gentle rivers and small streams of eastern France to erode its whole plain to the depths at which they now flow, acquires, it must be confessed, a fascinating grandeur, when, by similitude of feature and geology, we extend the hypothesis to the whole north-west frontiers of the continent, and assume, that from the estuary of the Seine to the eastern shores of the Baltic, every internal feature of valley, dale and ravine—in short, the entire intaglio of the surface—has been moulded by running waters, since the advent of the human race*."

But, on the other hand, it has been maintained that the pliant facts may be read as "expressions of violent and sudden mutations, only compatible with altogether briefer periods." The argument of the Paroxysmist, I still quote from Blackwood, would probably be something like the following:—

"Assuming the pre-existing *relief*, or excavation rather, of the surface to have approximated to that now prevailing, he will account for the gravel by supposing a sudden rocking movement of the lands and the bottom of the sea of the nature of an earthquake, or a succession of them, to have launched a portion of the temporarily uplifted waters upon the surface of the land."

Let us, however, examine the strata, and see whether the evidence they give is in reality so confused and contradictory.

Taking the section at St. Acheul and commencing at the bottom, we have first of all the partially rounded high-level gravel, throughout which, and especially at the lower part, the flint implements occur.

These beds but rarely contain vegetable remains. Large pieces of the oak, yew, and fir, have, however, been determined at Hoxne. The mammalia, also, are but few; the

* Blackwood's Magazine, October, 1860.

mammoth, the *Elephas antiquus*, with species of *Bos*, *Cervus*, and *Equus* are the only ones which have yet occurred at St. Acheul, though beds of the same age in other parts of England and France have added the *Rhinoceros tichorhinus*, the reindeer, and several other species. The mollusca are more numerous; they have been identified by Mr. J. G. Jeffreys, who finds in the upper-level gravel thirty-six species, all of them land or freshwater forms, and all belonging to existing species. It is hardly necessary to add, that these shells are not found in the coarse gravel, but only here and there, where quieter conditions, indicated by a seam of finer materials, have preserved them from destruction. Here, therefore, we have a conclusive answer to the suggestion that the gravel may have been heaped up to its present height by a sudden irruption of the sea. In that case we should find some marine remains; but as we do not, as all the fossils belong to animals which live on the land, or inhabit fresh waters, it is at once evident that this stratum, not being subaerial, must be a freshwater deposit, and as the most delicate shells are entire, it is equally evident that they were deposited in tranquil water, and not by a cataclysm.

But the gravel itself tells us even more than this: the river Somme flows through a country in which there are no rocks older than the chalk, and the gravel in its valley consists entirely of chalk flints and tertiary débris*. The Seine, on the other hand, receives tributaries which drain other formations. In the valley of the Yonne we find fragments of the crystalline rocks brought from the Morvan†. The Aube runs through cretaceous and Jurassic strata, and the gravels along its valley are entirely composed of materials derived from these formations. The valley of the Oise is in this respect particularly instructive: "De Maquenoise à Hirson‡

* Buteux, l. c. p. 98. † D'Archiac, Progrès de la Géologie, p. 163.
‡ D'Archiac, l. c. p. 155.

la vallée ne présente que des fragments plus ou moins roulés des roches de transition que traverse le cours de la rivière. En descendant à Etréaupont, on y trouve des calcaires jurassiques et des silex de la craie, formations qui ont succédé aux roches anciennes. A Guise, le dépôt erratique . . . . . est composé de quartzites et de schistes de transition de quelques grès plus recents, de silex de la craie, et surtout de quartz laiteux, dont le volume varie depuis celui de la tête jusqu'à celui de grains de sable. . . . . Au delà les fragments de roches anciennes diminuent graduellement en volume et en nombre." At Paris the granitic débris brought down by the Yonne forms a notable proportion of the gravel; and at Précy, near Creil on the Oise, the fragments of the ancient rocks are abundant; but lower down the Seine at Mantes, they are smaller and less numerous, while at Rouen and Pont de l'Arche I found none, though a longer search would doubtless have shown fragments of them. This case of the Oise is, however, interesting, not only on account of the valuable evidence contained in the above quotation; but because, though the river flows, as a glance at the map will show, immediately across and at right angles to the Somme, yet none of the ancient rocks which form the valley of the Oise have supplied any débris to the valley of the Somme: and this, though the two rivers are at one point within six miles of one another, and separated by a ridge only eighty feet in height.

The same division occurs between the Seine and the Loire: "Bien que la ligne de partage des eaux de la Loire et de la Seine, entre St. Amand (Nièvre) et Artenay, au nord d'Orléans, soit à peine sensible, aucun débris de roches venant du centre de la France, par la vallée de la Loire n'est passé dans le bassin de la Seine*."

In the Vivarais near Auvergne, "Les dépôts diluviens

* D'Archiac, l. c. p. 164.

sont composés des mêmes roches que celles que les rivières actuelles entraînent dans les vallées, et sont les débris des seules montagnes de la Lozin, du Tanargue et du Mézène, qui entourent le bassin du Vivarais*."

Again,

"Le diluvium des vallées de l'Aisne et de l'Aire ne renferme que les débris plus ou moins roulés des terrains que ces rivières coupent dans leur cours†."

Finally, Mr. Prestwich has pointed out that the same thing holds good in various English rivers. The conclusion deduced by M. D'Archiac from the consideration of these observations, and specially from those concerning the valley of the Seine, is "Que les courants diluviens ne venaient point d'une direction unique, mais qu'ils convergaient des bords du bassin vers son centre, suivant les dépressions préexistantes, et *que leur élévation ou leur force de transport ne suffisait pas pour faire passer les débris qu'ils charriaient d'une de ces vallées dans l'autre*‡."

Considering, however, all these facts, remembering that the constituents of these river-drift gravels, are, in all cases, derived from beds now *in situ* along the valley, that they have not only followed the lines of these valleys, but have done so in the direction of the present waterflow, and without in any case passing across from one river system to another, it seems quite unnecessary to call in the assistance of diluvial waves, or indeed any other agency than that of the rivers themselves.

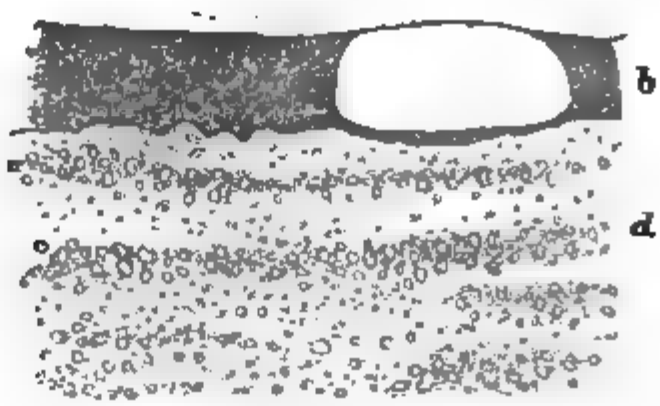
There are, however, certain facts in the case which have been regarded by most geologists as fatal to this hypothesis, and which prevented M. D'Archiac, as well as the French geologists generally, from adopting an explanation apparently so simple and so obvious. These difficulties appear

* D'Archiac, l. c. p. 160. † Malbos. Bull. Geol. vol. iii. p. 631.
‡ l. c. p. 163.

to have been twofold; or at least the two principal were, firstly, the large sandstone blocks which are scattered, throughout the river gravels of Northern and Central France; and secondly, the height at which the upper-level gravels stand above the present water-line. We will consider these two objections separately.

It must be admitted that the presence of the sandstone blocks in the gravels appears at first sight to be irreconcilable with our hypothesis. In some places they occur frequently, and are of considerable size; the largest I have myself seen is represented in the section, fig. 203, taken close to the railway-station at Joinville. It was 8ft. 6in. in length, with

FIG 203.



Section at Joinville.

a width of 2ft. 8in. and a thickness of 3ft. 4in. Even when we remember that at the time of its deposition the valley was not excavated to its present depth, we must still feel that a body of water with power to move such masses as these must have been very different from any floods now occurring in those valleys, and might fairly deserve the name of a cataclysm. But whence could we obtain so great a quantity of water? We have already seen that the gravel of the Oise, though so near, is entirely unlike that of the Somme, while that of the Seine, again, is quite different from that of any of the neighbouring rivers. These rivers, therefore, cannot have drained a larger area than at present; the river

systems must have been the same as now. Nor would the supposition, after all, account for the phenomena. We should but fall from Scylla into Charybdis. Around the blocks we see no evidence of violent action; in the section at Joinville, the grey subangular gravel passed under the large block above-mentioned, with scarcely any traces of disturbance. But a flood which could bring down so great a mass would certainly have swept away the comparatively light and movable gravel below. We cannot, therefore, account for the phenomena by aqueous action, because a flood which would deposit the sandstone blocks would remove the underlying gravel, and a flood which would deposit the gravel would not move the blocks. The Deus ex machinâ has not only been called in most unnecessarily, but, when examined, turns out to be but an idol after all.

Driven, then, to seek some other explanation of the difficulty, Mr. Prestwich falls back on that of floating ice. Here we have an agency which would satisfactorily explain all the difficulties of the case. The "packing" and propelling action of ice would also account for some irregularities in the arrangement of the beds which are very difficult otherwise to understand. We are, indeed, irresistibly reminded of the figure given by Sir Charles Lyell* from a view taken by Lieut. Bowen, of the boulders drifted by ice on the shores of the St. Lawrence. Sir C. Lyell's work is in the hands of almost every geologist, and it will, perhaps, therefore, be unnecessary for me to quote the accompanying description, accurately as it portrays what must, we think, have been taking place in the valley of the Somme thousands of years ago, just as it does in that of the St. Lawrence at the present time. Nor is it the physical evidence only, which points to an arctic climate during the period now

* Principles, 1853, p. 220.

under consideration; the fauna, as we have already seen, tells the same tale.

But though the presence of the sandstone blocks and the occasional contortions of the strata are in perfect accordance with the view of Mr. Prestwich, that the gravels have been deposited by the rivers, our second difficulty still remains—namely, the height at which the upper-level gravels stand above the present water-line. We cannot wonder that these beds have generally been attributed to violent cataclysms.

M. Boucher de Perthes was always of this opinion. "Ce coquillage," he says, "cet éléphant, cette hache, ou la main qui la fabriqua, furent donc témoins du cataclysme qui donna à notre pays sa configuration présente*."

M. C. D'Orbigny, observing that the fossils found in these quaternary beds are all either of land or freshwater animals, wisely dismisses the theory of any marine action, and expresses himself as follows:—"En effet l'opinion de la plupart des géologues est que les cataclysmes diluviens ont eu pour causes prédominantes de fortes oscillations de l'écorce terrestre, des soulèvements de montagnes au milieu de l'océan, d'où seraient résultées de grandes érosions. Par conséquent les puissants courants d'eau marine, auxquels on attribue ces érosions diluviennes, auraient dû laisser sur les continents des traces authentiques de leur passage, tels que de nombreux débris de coquilles, de poissons et autres animaux marins analogues à ceux qui vivent actuellement dans la mer. Or, ainsi que M. Cordier l'a fait remarquer depuis longtemps à son cours de géologie, rien de semblable n'a été constaté. Sur tous les points du globe où l'on a étudié les dépôts diluviens, on a reconnu que, sauf quelques rares exceptions très contestables, il n'existe dans ces dépôts aucun fossile marin: ou bien ce sont des fossiles arrachés aux terrains préexistants, dont la dénudation a fourni les ma-

* Mem. Soc. d'Em. l'Abbeville, 1861, p. 475.

tériaux qui composent le diluvium. En sorte que les dépôts diluviens semblent avoir eu pour cause des phénomènes météorologiques, et paraissent être le résultat d'immenses inondations *d'eau douce* et non d'eau marine, qui, se précipitant des points éléves vers la mer, auraient dénudé une grande partie de la surface du sol, balayé la généralité des êtres organisés et pour ainsi dire nivelé, coordonné les bassins hydrographiques actuels*."

Such cataclysms, however, as those thus suggested by M. D'Orbigny, and many other French geologists, even if admitted, would not account for the results before us. We have seen that the transport of materials have not followed any single direction, but has in all cases followed the lines of the present valleys, and the direction of the present water-flow; that the rocks of one valley are never transported into another; that the condition of the loëss is irreconcilable with a great rush of water; while, finally, the perfect preservation of many of the most delicate shells is clear proof that the phenomena are not due to violent or cataclysmic action.

We must, moreover, bear in mind that the gravels and sands are themselves both the proof and the results of an immense denudation. In a chalk country, such as that through which the Somme flows, each cubic foot of flint, gravel, or sand, represents the removal of, at the very least, twenty cubic feet of chalk, all of which, as we have already seen, must have been removed from the present area of drainage. In considering, therefore, the formation of these upper and older gravels, we must not picture to ourselves the original valley as it now is, but must, in imagination, restore all that immense mass of chalk which has been destroyed in the formation of the lower-level gravels and sands. Mr. Prestwich has endeavoured to illustrate this by a diagram†,

* C. D'Orbigny, Bul. Geo. 2nd ser. V. xvii. p. 6. See also D'Archiac, l. c. passim.

† Proceed. Roy. Soc. p. 1862, p. 41.

and I must once more repeat that this is no mere hypothesis, since the mass of sand and gravel cannot have been produced without an immense removal of the chalk. On the whole, then, we may safely conclude that the upper-level gravels were deposited by the existing river, before it had excavated the valley to its present depth and when consequently it ran at a level considerably higher than the present.

Far, therefore, from requiring an immense flood of water, two hundred feet in depth, the accumulation of the gravel may have been effected by an annual volume of water, differing little from that of the present river.

A given quantity of water will, however, produce very different effects, according to the rapidity with which it flows. "We learn from observation, that a velocity of three inches per second at the bottom will just begin to work upon fine clay fit for pottery, and however firm and compact it may be, it will tear it up. Yet no beds are more stable than clay when the velocities do not exceed this: for the water even takes away the impalpable particles of the superficial clay, leaving the particles of sand sticking by their lower half in the rest of the clay, which they now protect, making a very permanent bottom, if the stream does not bring down gravel or coarse sand, which will rub off this very thin crust, and allow another layer to be worn off. A velocity of six inches will lift fine sand, eight inches will lift sand as coarse as linseed, twelve inches will sweep along fine gravel, twenty-four inches will roll along rounded pebbles an inch diameter, and it requires three feet per second at the bottom to sweep along shivery angular stones of the size of an egg*."

If, therefore, we are justified in assuming a colder climate than that now existing, we should much increase the erosive

* Cyc. Brit. Article "Rivers," p. 274.

action of the river, not only because the rains would fall on a frozen surface, but because the rainfall of the winter months would accumulate on the high grounds in the form of ice and snow, and would every spring produce floods much greater than any which now occur*.

We now come to the light-coloured marl (fig. 202 *c*, p. 364). It is composed, according to Mr. Prestwich, as follows: Of white siliceous sand and light-coloured marl, mixed with fine chalk grit, a few large sub-angular flints, and an occasional sandstone block, irregular patches of flint gravel, bedding waved and contorted, here and there layers with diagonal seams, a few ochreous bands, portions concreted. Sand and freshwater shells common, some mammalian remains.

In the pits at Amiens this bed is generally distinct from the underlying gravels, owing perhaps to the upper portion of the gravel having been removed; but in several places (Précy, Ivry, Bicêtre, etc.) this section is complete, the coarser gravel below becoming finer and finer, and, at length, passing above into siliceous sand. These sections evidently indicate a gradual loss of power in the water at these particular spots; rapid enough at first to bring down large pebbles, its force became less and less until at length it was only able to carry fine sand. This, therefore, appears to indicate a slight change in the course of the river, and gradual excavation of the valley, which, by supplying the floods with a lower bed, left the waters at this height with a gradually diminishing force and velocity.

The upper part of the section at St. Acheul consists of brick earth (fig. 202 *a*), passing below into angular gravel, while between this and the underlying sandy marl is sometimes a small layer of darker brick earth. These beds, however, vary much even in adjoining sections. Taken as a

* See Murchison's Geology of Russia and the Ural Mountains, p. 572.

whole, they are regarded by Mr. Prestwich as the representatives of that remarkable loamy deposit which is found overlying the gravels in all these valleys of Northern France, and which, as the celebrated "loëss" of the Rhine, attains in some places a thickness of three hundred feet. The greatest development of it which I have seen in the north of France was in a pit in the Rue de la Chevalerie, near Ivry, where it was twenty-two feet thick; some of this, however, may have been reconstructed loëss brought down by rain from the higher ground in the immediate neighbourhood. Assuming that this loëss is composed of fine particles deposited from standing or slowly-moving waters, we might be disposed to wonder at not finding in it any traces of vegetable remains. We know, however, from the arrangement of the nails and hasps, that in some of the St. Acheul tombs wooden coffins were used, while the size of the nails shows that the planks must have been tolerably thick; yet every trace of wood has been removed, and not even a stain is left to indicate its presence. We need not, therefore, wonder at the absence of vegetable remains in the drift.

Such is a general account of those gravel-pits which lie at a height of from eighty to one hundred and fifty feet above the present water-level of the valleys, and which along the Somme are found in some places even at a height of two hundred feet.

Let us now visit some of the pits at the lower levels. At about thirty feet lower, as for instance at Menchecourt, near Abbeville, and at St. Roch, near Amiens, where the gravel slopes from a height of sixty feet down to the bottom of the valley, we find almost a repetition of the same succession; coarse sub-angular gravel below, finer materials above. So similar, indeed, are these beds to those already described, that it will be unnecessary for me to give any special description of them.

It seems highly probable that when the fauna and flora of the upper and lower-level gravels shall have been more thoroughly investigated, they will be found to be almost identical. At present, however, the species obtained from the lower-level gravels are more numerous than those from the upper levels.

Mr. Prestwich gives the following table of the mammalia :

	BEDFORD. Great Northern Railway, or Summerhouse Hill.	ABBEVILLE. Menchecourt.	AMIENS. St. Roch.	PARIS. Grenelle, Ivry, Clichy, or the Rue de Reuilly.
Elephas primigenius, *Blum.* .	*	*	*	*
—— antiquus, *Falc*.....	*s	...	*	*c
Rhinoceros tichorhinus, *Cuv.*	*r		*	*
—— megarhinus, *Christol*....	*r	...	...	*?g
Ursus spelæus, *Blum*.....	*s	*	...	...
Hyæna spelæa, *Gold*.....	...	*	...	*?g
Felis spelæa, *Gold.*	...	*	...	*
Bos primigenius, *Boj*.....	*?	*	*	*
Bison priscus, *Boj*.....	*r	*	...	*c
Equus (possibly two species)	*	*	*	*
Cervus euryceros, *Aldr*.....	*r	...	...	...
—— elaphus, *Linn*.	*	*	*	*
—— tarandus, *Linn*.....	*	*	...	*c
Hippopotamus major, *Nesti*...	*	...	*	*g
Sus.	*r	...	...	*

To this list we may add the lemming, the *Myodes torquatus*, and the musk ox, which has been found at two spots in the Thames valley, as well as at Chauny on the Oise.

The mollusca are fifty-two in number, of which forty-two now live in Sweden, thirty-seven in Finland, and thirty-eight in Lombardy. Bearing in mind that Lombardy is much richer than Finland in mollusca, this assemblage has rather a northern aspect.

In such a group of species as this the hippopotamus seems singularly out of place, and in the preceding chapter I have discussed the conclusions which are, I think, to be drawn from its presence; taking the fauna as a whole, however, and looking more especially to such animals as the musk ox, the reindeer, the lemming, the *Myodes torquatus*, the Siberian mammoth, and its faithful companion the woolly-haired rhinoceros, we have clear evidence of a climate unlike that now prevailing in Western Europe.

Finally, the lowest portion of the valley is at present occupied by a bed of gravel, covered by silt and peat, which latter is in some places more than thirty or even forty feet thick, and is extensively worked for fuel. These strata have afforded to the antiquaries of the neighbourhood, and especially to M. Boucher de Perthes, a rich harvest of interesting relics belonging to various periods. The depth at which these objects are found has been carefully noted by M. Boucher de Perthes.

"Prenant," he says, "pour terme moyen du sol de la vallée, une hauteur de 2 mètres audessus du niveau de la Somme, c'est à 30 à 40 centimètres de la surface qu'on rencontre le plus abondamment les traces du moyen-âge. Cinquante centimètres plus bas, on commence à trouver des débris romains, puis gallo-romains. On continue à suivre ces derniers pendant un mètre, c'est à dire jusqu'au niveau de la Somme. Après eux, viennent les vestiges gaulois purs qui descendent sans interruption jusqu'à près de 2 mètres audessous de ce niveau, preuve de la longue habitation de ces peuples dans la vallée. C'est à un mètre plus bas, ou à 4 mètres environ audessous de ce même niveau, qu'on arrive au centre du sol que nous avons nommé Celtique, celui que folèrent les Gaulois primitives ou les peuples qui les précédèrent;" and which belonged, therefore, to the Neolithic period. It is, however, hardly necessary to add that these

thicknesses are only given by M. Boucher de Perthes "comme terme approximatif."

The "Antiquités Celtiques" was published several years before the Swiss archæologists had made us acquainted with the nature of the Pfahlbauten; but, from some indications given by M. Boucher de Perthes, it would appear that there must have been, at one time, lake-habitations in the neighbourhood of Abbeville. He found considerable platforms of wood, with large quantities of bones, stone implements, and handles closely resembling those which come from the Swiss lake-villages.

These weapons cannot for an instant be confounded with the ruder ones from the drift-gravel. They are ground to a smooth surface and a cutting edge, while those of the more ancient types are merely chipped, not one of the many hundreds already found having shown the slightest trace of grinding. Yet though the former belong to the Stone Age, to a time so remote that the use of metal was apparently still unknown in Western Europe, they are separated from the earlier weapons of the upper-level drift by the whole period necessary for the excavation of the Somme Valley, to a depth of more than one hundred feet.

If, therefore, we get no definite date for the arrival of man in these countries, we can at least form a vivid idea of his antiquity. He must have seen the Somme running at a height of about a hundred feet above its present level. It is, indeed, probable that he dates back in Northern France almost, if not quite, as far as the rivers themselves. The fauna of the country was indeed unlike what it is now. Along the banks of the rivers ranged a savage race of hunters and fishermen, and in the forests wandered the mammoth, the two-horned woolly rhinoceros, a species of lion, the musk ox, the reindeer, and the urus.

Yet the geography of France cannot have been very dif-

ferent from what it is at present. The present rivers ran in their present directions, and the sea even then lay between the Somme and the Adur, though the channel was not so wide as it is now.

Gradually the river deepened its valley; ineffective, or even perhaps constructive, in autumn and winter, the melting of the snows turned it every spring into a roaring torrent. These floods were perhaps more destructive to animals even than man himself; while, however rude they may have been, our predecessors can hardly be supposed to have been incapable of foreseeing and consequently escaping the danger.

While the water had sufficient force to deposit coarse gravel at any given level, at a still higher one it would part with finer particles, and would thus form the loëss, which at the same time would here and there receive angular flints and shells brought down from the hills in a more or less transverse direction by the rivulets after heavy rains.

Mr. Prestwich regards the difference of level between the upper gravels and the loëss as "a measure of the floods of that period." If the gravel-beds were complete, this would no doubt be the case; but it seems to me that the upper-level gravels are mere fragments of an originally almost continuous deposit, and under such circumstances the present cannot be taken as evidence of the original difference.

As the valley became deeper and deeper the gravel would be deposited at lower and lower levels, the loëss always following it*; thus we must not consider the loëss as a distinct bed, but as one which was being formed during the same time, though never at the same place, as the beds of gravel. In fig. 204 I have given a diagram, the better to illustrate my meaning; the loëss is indicated by letters with

* See Mr. Prestwich's paper read before the Royal Society, June 19, 1862.

a dash and is dotted, while the gravels are represented as rudely stratified. In this case I suppose the river to have run originally on the level (1), and to have deposited the gravel (*a*) and the loëss (*a'*); after a certain amount of erosion, which would reduce the level to (2), the gravel would be spread out at (*b*), and loëss at (*b'*). Similarly the loëss (*c'*) would be contemporaneous with the gravel (*c*).

FIG. 204.

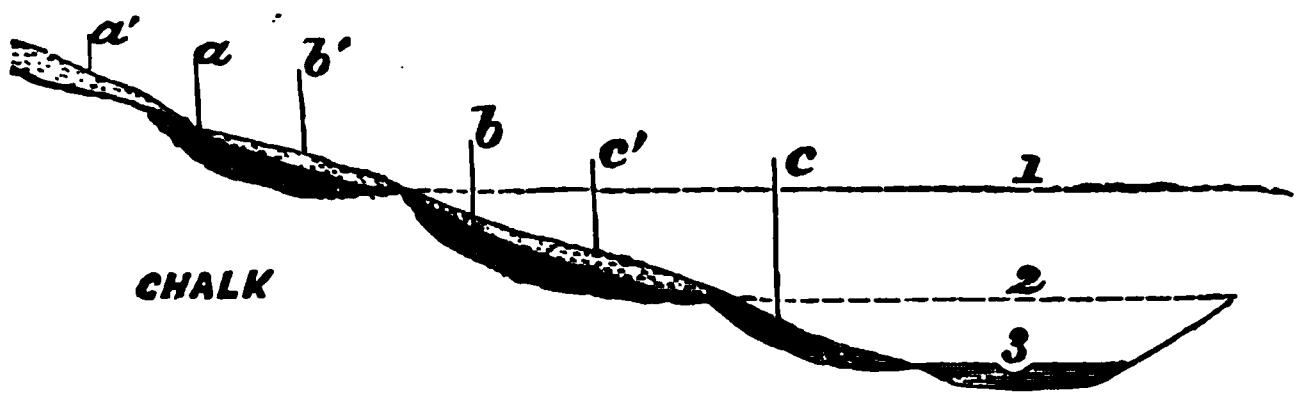


Diagram to show the Relations of the Loëss and the Gravels.

Thus, while in each section the lower beds would of course be the oldest, still the upper-level gravels as a whole would be the most ancient, and the beds lying in the lower parts of the valley the most modern.

For convenience I have represented the sides of the valley as forming a series of terraces; and though this is not actually the case, there are places in which such terraces do occur.

It is, however, well known that rivers continually tend to shift their courses; nor is the Somme any exception to the rule; the valley itself indeed is comparatively straight, but within it the river winds considerably, and when in one of its curves, the current crosses "its general line of descent, it eats out a curve in the opposite bank, or in the side of the hills bounding the valley, from which curve it is turned back again at an equal angle, so that it recrosses the line of descent, and gradually hollows out another curve lower down in the opposite bank," till the whole sides of the valley, or river-bed, "present a succession of salient and retiring

angles*." During these wanderings from one side of the valley to the other, the river continually undermines and removes the gravels which at an earlier period it had deposited. Thus the upper-level gravels are now only to be found here and there, as it were, in patches, while in many parts they have altogether disappeared; as, for instance, on the right side of the valley between Amiens and Pont Rémy, where hardly a trace of the high-level gravels is to be seen.

The neighbouring shores of England and France show various traces of a slight and recent elevation of the land. Raised beaches have been observed at an elevation of from five to ten feet at various points along the coasts of Sussex and the Pas de Calais. Marine shells also occur at Abbeville about twenty-five feet above the sea level†, and no doubt this change of level has had an important bearing on the excavation of the valley.

Mr. A. Tylor ‡, in a recent memoir, agrees with me that the upper-level and lower-level gravels are merely the extremes of a series, seldom complete, but generally imperfect, sometimes in one part, sometimes in another. But he also maintains that the surface of the chalk in the valley of the Somme had assumed its present form prior to the deposition of any of the gravel or loëss now existing in it. As, however, he admits that the materials forming this gravel and loëss are derived exclusively from the area drained by the Somme and its tributaries, he involves himself in a double difficulty. In the first place he maintains that the materials, by the removal of which the valley was formed, were swept completely out of the valley, which, considering its length, depth, and narrowness, appears to be impossible; and in the

* Lyell's Principles, p. 206.

† The higher-level gravels in some places fringe the coast at an elevation of as much as one hundred feet; this phenomenon, however, I should be disposed to refer principally to an encroachment of the sea on the land, and the consequent intersection of the old river-beds at a higher level.

‡ Geol. Journal, vol. xxiv. p. 103.

second place, the admission that the gravel and sand consist of flint débris brought down by the Somme and its tributaries, is fatal to his argument, since you cannot remove matter from one place to another, without affecting the configuration of the surface in both. In admitting then that "the gravel in the valley of the Somme at Amiens is partly derived from débris brought down by the river Somme, and by the two rivers, the Celle and the Arve, and partly consists of material from the adjoining higher grounds, washed in by land-floods*," Mr. Tylor virtually adopts the explanation of the phenomena given in this work, since the formation or removal of this gravel necessarily involved an alteration of the surface and a deepening of the valley.

When finally the excavation of the valley was completed, the climate had gradually become more like our own, and either from this change, or rather perhaps yielding to the irresistible power of man, the great Pachydermata became extinct. Under the altered conditions of level, the river, unable to carry out to sea the finer particles brought down from the higher levels, deposited them in the valley, and thus raised somewhat its general level, checking the velocity of the stream, and producing extensive marshes, in which a thick deposit of peat was gradually formed. We have, unfortunately, no trustworthy means of estimating the rate of formation of this substance, which indeed varies considerably, according to the conditions of the case, but on any supposition the production of a mass in some places more than thirty feet in thickness must have required a very considerable period. Yet it is in these beds that we find the remains of the Neolithic or later Stone period. From the tombs at St. Acheul, from the Roman remains found in the superficial layers of the peat, at about the present level of the river, we know that fifteen hundred years have produced scarcely any

* l. c. p. 105.

change in the configuration of the valley. In the peat, and at a depth of about fifteen feet in the alluvium at Abbeville, are the remains of the Neolithic period, which we have ample reason for believing, from the researches in Denmark, Switzerland, and other countries, to be of no slight antiquity. Yet all these are subsequent to the excavation of the valley. What date then are we to ascribe to the men who lived when the Somme was but beginning its great task? No one can properly appreciate the lapse of time indicated, who has not stood on the heights of Liercourt, Picquigny, or on one of the other points overlooking the valley: nor, I am sure, could any geologist return from such a visit without an overpowering sense of the changes which have taken place, and the length of time which must have elapsed since the first appearance of man in Western Europe.

CHAPTER XII.

ON THE ANTIQUITY OF MAN.

ALTHOUGH the facts recorded in the preceding chapters have been for the most part discovered within a comparatively recent period, it is by no means merely of late years, or among archæologists only, that the difficulties in Archbishop Usher's chronology have been felt to be insuperable. Historians, philologists, and physiologists have alike admitted that the short period allowed could hardly be reconciled with the history of some eastern nations; that it did not leave room for the development either of the different languages, or (assuming the unity of the human race) for the important physical peculiarities, by which the various races of men are distinguished.

Thus, Dr. Prichard says, "Many writers who have been by no means inclined to raise objections against the authority of the Sacred Scriptures, and in particular Michaelis, have felt themselves embarrassed by the shortness of the interval between the Noachic Deluge and the period at which the records of various nations commence, or the earliest date to which their historical memorials lead us back. The extravagant claims to a remote and almost fathomless antiquity, made by the fabulists of many ancient nations, have vanished before the touch of accurate criticism; but after abstracting all that is apparently mythological from the early traditions of the Indians, Egyptians, and some other nations, the probable history of some of them seems still to reach up to a

period too remote to be reconciled with the short chronology of Usher and Petavius. This has been so universally felt by all those writers who have entered on the investigation of primeval history that it is superfluous to dwell upon the subject*."

Baron Bunsen, one of the ablest among those who regard the various forms of language as having had a common origin, is forced to claim for the human race an antiquity of at least 20,000 years. Again, the ingenious author of "The Genesis of the Earth and of Man†," says truly that "one of the greatest of the difficulties that beset us when we endeavour to account for the commonly supposed descent of all mankind from a single pair, ... lies in the fact of our finding, upon Egyptian monuments, mostly of the thirteenth, fourteenth, and fifteenth centuries before the Christian era, representations of individuals of numerous nations, African, Asiatic, and European, differing in physical characteristics as widely as any equal number of nations of the present age that could be grouped together; among these being negroes, of the true Nigritian stamp, depicted with a fidelity, as to colour and features, hardly to be surpassed by an accomplished modern artist. That such diversities had been produced by natural means in the interval between that remote age and the time of Noah, probably no one versed in the sciences of anatomy and physiology will consider credible," and he concludes, therefore, that the human race cannot have been derived from a single pair. For, just as the philological difficulties will not, of course, affect those who accept literally the account given in our English Version of the miraculous creation of languages at the Tower of Babel; so in the same way "the shortness of the period allowed by the received chronology, for the

* Prichard, Researches into the Physical Hist. of Mankind, vol. v. p. 553.
† l. c. p. 117.

development of those physical varieties which distinguish the different races of men*," though felt as "one of the greatest difficulties connected with the opinion that all mankind are descended from one primitive stock," will not affect those who believe in the existence of separate species of men.

Prof. Huxley has also deduced a very interesting argument from the geographical distribution of the races of men. He divides mankind into four groups, the Australoid, Negroid, Mongoloid, and Xanthochroid. The latter are the fair, light-haired, blue-eyed people who occupy a large part of Europe; the Mongoloid are the Tartar, American, and Polynesian races; the Negroid are the Negroes, Hottentots, and Negritos; and the Australoid type contains all the inhabitants of Australia, and the native races of the Deccan, with whom he also associates the Ancient Egyptians. Whatever difference of opinion may exist among ethnologists about the other three divisions, still as to the Negroid race most are agreed, and this is the one to which I now wish to call attention. The geographical distribution of the Xanthochroid and Mongoloid races presents no difficulty, nor will I here discuss that of the Australoid group. But I entirely agree with Prof. Huxley that the present position of the Negro race cannot be explained excepting on the hypothesis that since the appearance of that race immense geographical changes have taken place,—that continent has become ocean, and sea, land. The negroes are essentially a non-navigating race; they build no ships, and even the canoes of the Feegeeans are evidently copied from those of the Polynesians. Now what is the geographical distribution of the race? They occupy all Africa south of the Sahara,—which neither they nor the rest of the true African fauna have ever crossed, and though they do not occur in Arabia, Persia, Hindostan,

* Prichard, l. c. p. 552.

Siam, or China, we find them in Madagascar, and in the Andaman Islands,—not in Java, Sumatra, or Borneo, but in the Malay peninsular, in the Philippines, New Guinea, the New Hebrides, New Caledonia, the Feegee Islands, and in Tasmania.

This remarkable distribution is perhaps most easily explicable on the hypothesis that since the Negroid race came into existence there must have been an immense tract of land or a chain of islands stretching from the eastern coast of Africa right across the Indian Ocean, and secondly, that sea then occupied the area of the present great desert. In whatever manner, however, these facts are to be explained, they certainly indicate that the Negro race is of very great antiquity.

I have often been much struck, when standing at the feet of glaciers, by the great size of the terminal moraines, and the length of time which must have been required for their formation. Let us take as an instance the Nigaard glacier in the Justedal, on the Sognefjord. The Norwegian glaciers no doubt covered formerly a much larger area than that which they now occupy. They retreated as the cold diminished; but we have already seen that man was present in Western Europe when the general temperature was several degrees at least lower than it is at present; and we shall probably, therefore, be within the mark if we suppose that the glacier at Justedal has retreated at least a mile up the valley since the period of the river-drift gravels, and the entrance of man into Europe. Now the terminal moraine of the glacier covers the whole of this space with great blocks of stones, thousands and hundreds of thousands in number, and yet, although all these have probably been brought down in the human period, I could only see a few blocks on the lower end of the glacier itself.

As far as Denmark is concerned we must, for the present,

rely principally on the double change which has taken place in the prevalent vegetation. Beech forests are now the pride of the country, and, as far as tradition goes, they have always been so. But, as is shown by the peat-bogs, this is a mistake. The large peat-mosses do not help us very much in this matter, but there are in many of the forests, small and deep depressions, filled with peat, and called skov-mose. These, as might naturally be expected, contain many trees which grew on their edges, and at length fell into them. At the bottom is usually an amorphous peat, above is a layer of pines—a tree which does not now grow naturally in Denmark. Higher up the pines disappear, and are replaced by oaks, and white birches, neither of which are now common in Denmark; while the upper layer consists principally of the Betula verrucosa, and corresponds to the present, which we may call the Beech period. Professor Steenstrup has found stone implements among the stems of the pines, and as the capercailzie, which feeds on the young shoots of the pine, has been found in the Kjökkenmöddings, it seems likely, to say the least, that these shell-mounds belong to the pine period, and that the three great stages of civilization correspond in some measure to these three periods of arborescent vegetation. For one species of tree thus to displace another, and in its turn to be supplanted by a third, would evidently require a great, though at present we have no means of measuring how great, lapse of time.

Turning now from Denmark to Switzerland, there are two cases in which a more definite estimate has been attempted. We must not, indeed, place too much reliance on them as yet, but if many calculations made on different data shall agree in the main, we may at length come to some approximate conclusion.

The first of these calculations we owe to M. Morlot. The

torrent of the Tinière, at the point where it falls into the Lake of Geneva, near Villeneuve, has gradually built up a cone of gravel and alluvium. In the formation of the railway this cone has been bisected for a length of one thousand feet, and to a depth, in the central part, of about thirty-two feet six inches above the level of the railway. The section of the cone thus obtained shows a very regular structure, which proves that its formation was gradual. It is composed of the same materials (sand, gravel, and large blocks) as those which are even now brought down by the stream. The amount of detritus does, indeed, differ considerably from year to year, but in the long-run the differences compensate for one another, so that, when considering long periods, and the structure of the whole mass, the influences of the temporary variations, which arise from meteorological causes, altogether disappear, and need not, therefore, be taken into account. Documents preserved in the archives of Villeneuve show that in the year 1710 the stream was dammed up, and its course a little altered, which makes the present cone slightly irregular. That the change was not of any great antiquity is also shown by the fact that on the side where the cone was protected by the dykes, the vegetable soil, where it has been affected by cultivation, does not exceed two or three inches in thickness. On the side thus protected by the dykes the railway cutting has exposed three layers of vegetable soil, each of which must, at one time, have formed the surface of the cone. They are regularly intercalated among the gravel, and parallel to one another, as well as to the present surface of the cone, which itself follows a very regular curve. The first of these ancient surfaces was traced on the south side of the cone, over a surface of 15,000 square feet: it had a thickness of four to six inches, and occurred at a depth of about four feet (1.14 metre measured to the base of the layer) below the present surface of

the cone. This layer, which belonged to the Roman period, contained tiles and a Roman coin.

The second layer was traced over a surface of 25,000 square feet; it was six inches in thickness, and lay at a depth of about ten feet (2.97 metres) including the thickness of the layer. In it have been found several fragments of unglazed pottery, and a pair of tweezers in bronze. The third layer has been followed for 3500 square feet; it was six or seven inches in thickness, and lay at a depth of nineteen feet (5.69 metres) below the present surface: in it were found some fragments of very rude pottery, some pieces of charcoal, some broken bones, and a human skeleton with a small, round, and very thick skull. Fragments of charcoal were even found a foot deeper, and it is also worthy of notice that no trace of tiles was found below the upper layer of earth.

Towards the centre of the cone, the three layers disappear, since, at this part, the torrent has most force, and has deposited the coarsest materials, even some blocks as much as three feet in diameter. The farther we go from this central region, the smaller are the materials deposited, and the more easily might a layer of earth, formed since the last great inundations, be covered over by fresh deposits. Thus, at a depth of ten feet, in the gravel on the south of the cone, at a part where the layer of earth belonging to the Bronze Age had already disappeared, two unrolled bronze implements were discovered. They had probably been retained by their weight, when the earth which once covered them was washed away by the torrent. After disappearing towards the centre of the cone, the three layers reappear on the north side, at a slightly greater depth, but with the same regularity, and the same relative position. The layer of the Stone Age was but slightly interrupted, while that of the Bronze era was easily distinguishable by its peculiar character and colour.

It must be confessed that the starting-point of this argument, viz. the so-called "Roman" layer, is far from being satisfactorily determined. It is quite possible that tiles were used in Switzerland before the "Roman" period; it is probable that they continued in use to a later period. The coin found in the "Roman" layer was so much worn as to be undeterminable; it had, therefore, probably been long in use. M. Uhlmann has also argued* that the bones found in the lower layer are not such as we should expect to find in a Stone Age deposit, since they are not so much discoloured as those from the Stone Age pfahlbauten, and all belong to domestic animals. Only fourteen determinable fragments, however, were found, and of these several probably belonged to a single individual. Moreover, it would be very illogical to compare the condition of bones from a peat-moss with those which had been lying in a material such as that forming the cone of the Tinière.

M. Morlot did not disguise from himself that there were certain elements of doubt in the case, but on the whole it seemed to him that the phenomena were so regular and so well marked that he was justified in applying to them a calculation, with some little confidence of at least approximate accuracy. Making some allowances; for instance, admitting three hundred years instead of one hundred and fifty, for the period since the embankment, and taking the Roman period as representing an antiquity of from sixteen to eighteen centuries, he obtains for the age of Bronze an antiquity of from 2900 years to 4200 years, for that of the Stone period from 4700 to 7000 years, and for the whole cone an age of from 7400 to 11,000 years. M. Morlot thought that we should be most nearly correct in deducting two hundred years only for the action of the dykes, and in attributing to

* Ueber Thierreste und Gebisstheil gefunden in den Schuttablagerungen der Tinière. Bern, 1868.

the Roman layer an antiquity of sixteen centuries, that is to say, in referring it to the middle of the third century. This would give an antiquity of 3800 years for the Bronze Age, and 6400 years for that of Stone; and, on the whole, he is inclined to suppose for the former an antiquity of from 3000 to 4000 years, and for the latter of from 5000 to 7000 years.

Not less ingenious is the attempt which has been made by M. Gilliéron*, Professor at the College of Neuveville, to obtain a date for the lake-habitation at the Pont de Thièle. This stream connects the lakes of Neufchatel and Bienne. During the first part of its course, the valley is narrow, and the bridge, close to which the lake-dwelling has been discovered, is situated at the narrowest spot. A little farther down the valley suddenly expands, and from this point remains of the same width until it joins the Lake of Bienne. It is evident that the valley, as far as the bridge over the Thièle, was once occupied by the lake, which has gradually been silted up by the action of forces still in operation, and, if we could ascertain how long it would have taken to effect this change, we should then know approximately the date of the remains found at the Pont de Thièle, which are evidently those of a lake-dwelling. The Abbey of St. Jean, which stands in this valley, about 375 metres from the present shore of the lake, was founded, according to ancient documents, between the years 1090 and 1106, and is therefore about 750 years old. It is possible that the abbey may not have been built exactly on the then edge of the lake; but even if this were the case, the gain of land will only have been 375 metres in 750 years. Prof. Gilliéron does not compare with this the whole space between the convent and the lake-dwelling, because in the narrower part of the valley, in which the latter is situated, the gain may have been more

* Notice sur les Habitations Lacustres du Pont de Thièle. Porrentruy, 1862.

rapid; but if we only go to the point at which the basin contracts, we shall have a distance of 3000 metres, which would upon these data indicate a minimum antiquity of 6750 years. This calculation assumes that the shape of the bottom of the valley was originally uniform. M. Morlot agrees with Prof. Gilliéron in believing that this was the case, and from the general configuration of the valley it seems to me also to be a reasonable supposition. Moreover, the soundings taken by M. Hisely in the Lake of Bienne show that the variations in depth are but of slight importance. These two calculations, then, appear to indicate that 6000 or 7000 years ago Switzerland was already inhabited by men who used polished stone implements, but how long they had been there, or how many centuries elapsed before the discovery of metal, we have as yet no evidence to show.

A still greater antiquity was obtained by Mr. Horner as the result of his Egyptian researches, which were undertaken at the joint expense of the Royal Society and the Egyptian Government. Every year the Nile, during its periodical overflow, deposits a certain amount of fine mud, and even as long ago as the time of Herodotus it was inferred that Egypt had been formerly an arm of the sea, filled up gradually and converted into dry land by the mud brought down from the upper country.

In the great work on Egypt which we owe to the French philosophers who accompanied Napoleon's expedition to that country, an attempt was made to estimate the secular elevation thus produced, and it was assumed to be five inches in a century. This general average was consistent, however, with great differences at different parts, and Mr. Horner, therefore, did not consider himself justified in applying this estimate to particular cases, even if he had been satisfied with the evidence on which it rested. He preferred to examine the accumulation which had taken place round monu-

ments of known age, and selected two—namely, the obelisk at Heliopolis, and the statue of Rameses II., in Memphis. "The obelisk is believed to have been erected 2300 years B.C., and adding 1850, the year when the observation was made (June, 1851, i. e. before the inundation of that year), we have 4150 years in which the eleven feet of sediment were deposited, which is at the rate of 3.18 inches in a century*." But Mr. Horner himself admits that "entire reliance cannot be placed on this conclusion, principally because it is possible that the site originally chosen for the temple and city of Heliopolis was a portion of land somewhat raised above the level of the rest of the desert." He relies, therefore, principally on the evidence supplied by the colossal statue in Memphis. In this case the present surface is 10 feet $6\frac{3}{4}$ inches above the base of the platform on which the statue stood. Assuming that the platform was sunk $14\frac{3}{4}$ inches below the surface of the ground at the time it was laid, we have a depth of sediment from the present surface to that level of 9 feet 4 inches. Rameses is supposed by Lepsius to have reigned between 1394 and 1328 B.C., which would give an antiquity of 3215 years, and consequently a mean increase of $3\frac{1}{2}$ inches in a century. Having thus obtained an approximate measure of the rate of deposit in that part of the Nile valley, Mr. Horner dug several pits to a considerable depth, and in one of them, close to the statue and at the depth of 39 feet, a piece of pottery was found, which upon the above data would indicate an antiquity of about 13,000 years.

In many other excavations, pieces of pottery and other indications of man were found at even greater depths, but it must be confessed that there are several reasons which render the calculations somewhat doubtful. For instance, it is impossible to ascertain how far the pedestal of the statue

* Horner, Phil. Trans., 1858, p. 73.

was inserted into the ground; Mr. Horner has allowed 14¾ inches, but if it was much deeper, the rate of deposition would be diminished, and the age increased. On the other hand, if the statue was on raised ground, of course the reverse would be the case.

It has also been argued that the ancient Egyptians were in the habit of making embankments round the areas on which they erected temples, statues, etc., so as to keep out the waters of the Nile.

"Whenever, then," says Sir Charles Lyell, "the waters at length break into such depressions, they must at first carry with them into the enclosure much mud washed from the steep surrounding banks, so that a greater quantity would be deposited in a few years than, perhaps, in as many centuries on the great plain outside the depressed area, where no such disturbing causes intervened." This objection is, however, untenable, because the rapidity of depression will be in proportion to the previous retardation, and will only tend to bring the depressed area up to the general level. Supposing, for instance, that the monument of Rameses, erected on the flat plain of Memphis 3200 years ago, was protected by embankments for the first 2000 years, and that during that time the plain outside was gradually raised 5 feet 10 inches, being at the rate of 3½ inches in a century. When the embankment gave way the space enclosed would soon be filled up to the general level, and a thickness of 5 feet 10 inches might be deposited in a few years: still this exceptionally rapid accumulation would only be the complement of the exceptional want of deposit which had preceded it; and, consequently, when the level of the surrounding plain had been attained, then, although the mud covering the base of the statue may have been altogether deposited in the last few hundred years, i.e. since the embankments have been neglected, the thickness of the deposit will still

be a measure of the general elevation which has taken place on the surrounding plain since the erection of the monument.

Even if the embankments had remained intact to this day, and the monument stood now in the hollow thus produced, Mr. Horner's argument would not be invalidated, but rather confirmed. The depth of the hollow would give us a measure of the deposit which had taken place since the erection of the monument, or rather since the formation of the embankment. If, however, the monument had been erected in an area already depressed by the action of still older embankments, the calculation would be vitiated, but in this case the rate of deposition would appear to be greater than it really is, and the true age consequently would be even greater than the above estimate. There are other causes, however, which prevent me from accepting unreservedly the conclusions of Mr. Horner, although his experiments are of great importance, and much credit is due to the Egyptian government for the liberal manner in which they assisted Mr. Horner and the Royal Society in this investigation.

I have already mentioned the evidence on which M. Morlot has endeavoured to estimate the age of the Cone de la Tinière, and which gave about six thousand years for the lower layer of vegetable soil, and ten thousand years for the whole of the existing cone. But above this existing cone is another, which was formed when the lake stood at a higher level than at present, and which M. Morlot refers to the period of the river-drift gravels. This drift-age cone is about twelve times as large as that now forming, and would appear, therefore, on the same data, to indicate an antiquity of more than one hundred thousand years.

In his "Travels in North America," Sir C. Lyell has endeavoured to estimate the age of the Mississippi delta in the following manner:—"Dr. Riddle," he says, "communi-

cated to me, at New Orleans, the result of a series of experiments which he had made to ascertain the proportion of sediment contained in the waters of the Mississippi. He concluded that the mean annual amount of solid matter was to the water as $\frac{1}{1245}$ in weight, or about $\frac{1}{3000}$ in volume. Since that period he has made another series of experiments, and his tables show that the quantity of mud held in suspension, increases regularly with the increased height and velocity of the stream. On the whole, comparing the flood season with that of clearest water, his experiments, continued down to 1849, give an average annual quantity of solid matter somewhat less than his first estimate, but not varying materially from it. From these observations, and those of Dr. Carpenter and Mr. Forskey (an eminent engineer, to whom I have before alluded), on the average width, depth, and velocity of the Mississippi, the mean annual discharge of water and sediment were deduced. I then assumed 528 feet, or the tenth of a mile, as the probable thickness of the deposit of mud and sand in the delta; founding my conjecture chiefly on the depth of the Gulf of Mexico between the southern point of Florida and the Balize, which equals, on an average, one hundred fathoms, and partly on some borings six hundred feet deep, in the delta near Lake Pontchartrain, north of New Orleans, in which the bottom of the alluvial matter is said not to have been reached. The area of the delta being about 13,600 square statute miles, and the quantity of solid matter annually brought down the river, 3,702,758,400 cubic feet, it must have taken 67,000 years for the formation of the whole; and if the alluvial matter of the plain above be 264 feet deep, or half that of the delta, it must have required 33,500 more years for its accumulation, even if its area be estimated only as equal to that of the delta, whereas it is, in fact, larger."

Moreover, as Sir Charles has himself pointed out, a very

large proportion of the mud brought down by the river is not deposited in the delta, but is carried out into the gulf. In the "Antiquity of Man*," he refers to the above given calculation, and admits that the discharge of water seems to have been much underrated by the earlier experiments. Messrs. Humphrey and Abbot, who have recently surveyed the delta, also "remark that the river pushes along its bottom into the gulf a certain quantity of sand and gravel, which would," they suppose, "augment the volume of solid matter by about one-tenth." This, of course, would greatly diminish the time required; but taking into consideration the quantity of mud which is carried out to sea, and which was not allowed for in the previous calculation, Sir Charles Lyell still regards 100,000 years as a moderate estimate; and he considers that, "the alluvium of the Somme containing flint implements and the remains of the mammoth and hyæna," is no less ancient.

Again, whatever cause or causes may have produced the great change which has taken place in the climate of Western Europe, there can be little doubt that this change indicates a very considerable lapse of time. We are indebted to Mr. Hopkins for a very interesting memoir on this subject. Among the possible causes of change he discusses—

Firstly, A variation in the intensity of solar radiation.

To this theory Mr. Hopkins sees no *à priori* objection; but he does not feel disposed to attach much weight to it, because it is "a mere hypothesis framed to account for a single and limited class of facts, and unsupported by the testimony of any other class of allied, but independent phenomena."

It is, moreover, open to the objections stated with great force by Professor Tyndall†, who argues that the ancient

* Appendix to third edition of the Antiquity of Man, p. 16. See also Geological Journal, 1869, vol. xxv. p. 11.

† Heat considered as a Mode of Motion, p. 192.

glaciers indicate the action of heat as much as of cold. "Cold," he says, "will not produce glaciers. You may have the bitterest north-east winds here in London throughout the winter, without a single flake of snow. Cold must have the fitting object to operate upon, and this object—the aqueous vapour of the air—is the direct product of heat. Let us put this glacier question in another form: the latent heat of aqueous vapour, at the temperature of its production in the tropics, is about 1000° Fahr., for the latent heat augments as the temperature of evaporation descends. A pound of water thus vaporized at the equator, has absorbed one thousand times the quantity of heat which would raise a pound of the liquid one degree in temperature. . . . . It is perfectly manifest that by weakening the sun's action, either through a defect of emission, or by the steeping of the entire solar system in space of a low temperature, we should be cutting off the glaciers at their source."

Professor Frankland has even gone so far as to express the opinion that "the sole cause of the phenomena of the glacial epoch was a higher temperature of the ocean than that which obtains at present*," having no doubt overlooked the fact that the fauna of the sea, as well as of the land, had an Arctic character.

Secondly. Admitting the proper motion of the sun, it has been suggested that we may have recently passed from a colder into a warmer region of space.

I must refer to Mr. Hopkins' memoir for his objections to this suggestion; they certainly appear to "render the theory utterly inapplicable to the explanation of the changes of temperature at the more recent geological epochs."

This hypothesis, moreover, is liable to the same fatal objection as the first. To produce snow requires both heat and cold; the first to evaporate, the second to condense.

* Phil. Mag. 1864, p. 328.

In fact, what we require is a greater contrast between the temperature of the tropics and that of our latitudes; so that, paradoxical as it may appear, the primary cause of the "glacial" epoch may be, after all, an elevation of temperature in the tropics, causing a greater amount of evaporation in the equatorial regions and consequently a greater supply of the raw material of snow in the temperate regions during the winter months.

Thirdly. An alteration in the earth's axis.

The possibility of such a change has been denied by many astronomers. My father, the late Sir J. W. Lubbock, has, on the contrary, maintained* that this would necessarily follow from upheavals and depressions of the earth's surface, if only they were of sufficient magnitude. The same view has recently been taken by other mathematicians. This suggestion, like the preceding, presupposes immense geographical changes, which would therefore necessarily imply an enormous lapse of time.

Fourthly. Mr. Hopkins inclines to find the true solution of the difficulty in the supposition that the Gulf-Stream did not at this period warm the shores of Europe. "A depression of 2000 feet would," he says, "convert the Mississippi into a great arm of the sea, of which the present Gulf of Mexico would form the southern extremity, and which would communicate at its northern extremity with the waters occupying the . . . . great valley now occupied by the chain of lakes." In this case the Gulf-Stream would no longer be deflected by the American coasts, but would pass directly up this channel into the Arctic Sea; and as a very great ocean current must have its counter current, it is probable that there would be a flow of cold water from the North between the coasts of Norway and Greenland. The absence of the Gulf-Stream would probably lower the January temperature

* Geol. Journ. vol. v. p. 4.

of Western Europe ten degrees, while the presence of a cold current from the north would make a further difference of about three or four degrees*, an alteration of the climate which would apparently be sufficient to account for all the phenomena. This theory Mr. Hopkins considers as no mere hypothesis, but as necessarily following from the submergence of North America, which has been inferred from evidence of a different nature.

In this case, of course, the periods of great cold in Europe and in America must have been successive, and not synchronous; and it may also be observed, that in this suggested deflection of the Gulf-Stream, Mr. Hopkins was contemplating a period anterior to that of the present rivers. For if we are to adopt this solution of the difficulty, an immense time would be required. If, when the gravels and loëss of the Somme and the Seine were being deposited, the Gulf-Stream was passing up what is now the valley of the Mississippi, then it follows that the formation of the loëss in that valley and its delta, an accumulation which Sir C. Lyell has shown to require a period of about 100,000 years, would be subsequent to the excavation of the Somme valley, and to the presence of man in Western Europe.

The deflection of the Gulf-Stream from our coasts might, however, be owing to another cause, namely, a subsidence of the isthmus of Panama; in support of which suggestion may be mentioned the remarkable fact recently observed by Dr. Gunther, that out of 173 tropical marine fish, no less than 57, or 30 per cent., occur on both sides of the isthmus; in both the Atlantic and the Pacific†.

Mr. Croll, however, has pointed out that at present the "S.E. trade winds of the Atlantic blow with greater force than the N.E. trades, and the consequence is that the S.E. trades sometimes extend to 10° or 15° N. lat., whereas the

* Hopkins, l. c. p. 85.

† Trans. Zool. Soc. vol. vi. p. 397.

N.E. trades seldom blow south of the equator. But during the glacial epoch the very reverse must have occurred. Hence the great equatorial current of the Atlantic must during that period have been driven considerably south of its present position *." Even at present, while the greater part of the water enters the Gulf of Mexico, one portion is deflected southwards, which in the case mentioned above would happen to the greater portion, if not the whole.

Under existing circumstances, however, the southern division is comparatively small; by far the larger portion of the great equatorial current turns northwards, and warms the northern hemisphere, so that the comparatively high temperature of the Northern Atlantic is in some measure due to heat derived from the Southern hemisphere. In a recent memoir † Mr. Croll has shown the great effect produced by the Gulf-Stream on the present climate of Europe. He calculates that it conveys as much heat as is received from the sun by 3,121,870 square miles at the Equator, nearly as much as is received from the sun by the entire Arctic regions, the proportions being as 15 to 18. Our present climate is 12° higher than the normal due to its latitude, but Mr. Croll points out that this is by no means to be considered as measuring the effect of the Gulf-Stream. The temperature of the whole hemisphere is raised by the equatorial currents, and the 12° "only represent the number of degrees that the mean normal temperature of our island stands above what is called the normal temperature of the latitude."

There is yet another cause to which the present mild temperature of Europe is partly due, and which must not be altogether neglected. At the period under consideration, indeed, the geography of Western Europe must have been very nearly what it is now. There is, however, good reason

* Croll, Philosophical Magazine, Aug. 1864.
† l. c. Feb. and Oct. 1870.

for considering that the desert of Sahara then formed part of the Atlantic Ocean. Mr. Tristram has called attention to cliffs, ancient sea-beaches, and lines of terraces along the northern margin of the desert, and the common cockle is still found living in some of the salt lakes. Mr. Tristram also discovered a species of *Haligenes*, which inhabits the Gulf of Guinea, in a salt lake in lat. 32° N. and long. 7° E., separated, therefore, from its present marine habitat by the whole extent of the Great Desert. Moreover, as we have already seen, the present geographical distribution of animals can only be explained on the hypothesis that the existing fauna, including man, occupied Africa long before the Sahara became dry land.

Mr. Croll has shown in the memoir already cited that currents of warm water produce a far greater effect upon climate than aerial currents of equal volume and temperature, yet it is evident that such a change would have a great effect on the climate of Europe. At present we receive from the south, hot dry winds, which warm us both directly and also indirectly by melting the snow and ice on our mountain-tops. If the Sahara was a sea, the "Fohn," instead of being a burning, dry wind, which strips the snow off the Alps, both by melting and evaporation, would be a moist, damp wind, and when it reached the mountains would produce dense clouds and thick fogs, which would prevent the sun's rays from warming the earth or melting the glaciers. So that to the barren desert of the Sahara, which we are apt to look upon as a useless waste, we are in reality much indebted for the fertility and civilization of Europe.

M. Adhémar * has suggested a mode of accounting for the cold of the glacial epoch, which, if the true one, would give us means of calculating its antiquity. If the plane of

* Revolutions de la Mer. J. Adhémar. Paris.

the equator coincided exactly with that of the ecliptic, i. e. with that of the earth's orbit, then it is evident that every day would be followed by a night of equal length. In consequence, however, of the obliquity of the ecliptic, there are only two days in the year when this is actually the case, namely, the 20th of March and the 23rd September. Thus our year is divided into four well marked periods. "Winter" begins on the 22nd December, which is the shortest day of the year, and continues until the 20th March, which is called the spring equinox, because on it the day and night are of equal lengths. "Spring" commences on the 20th March and continues till the 21st June, during which time the days continue to elongate at the expense of the night.

From the 21st June, however, which is the first day of "summer," the days begin to shorten, until, on the 23rd of September, day and night are again equal, and we have the autumn equinox.

Autumn commences on the 23rd September, and the days continue to diminish till the 22nd December, which is the shortest day, and after which they begin to lengthen.

At present, then, the northern hemisphere enjoys in each year seven days more of spring and summer than of autumn and winter, while, on the other hand, the southern hemisphere has seven days more of autumn and winter than of spring and summer. This inequality of the seasons is due to the greater rapidity with which the earth moves when it is in perihelion, or nearest the sun, as is the case on the 31st December.

The dates of perihelion and spring equinox have not always been, nor will they always continue to be, the same as at present. On the contrary, a constant though slow movement is continually taking place: the spring equinox, which is now on the 20th March, will after a while be on the

19th, then on the 18th, and so on; whilst perihelion, which now happens on the 31st December, will in the lapse of time fall on the 1st of January, then on the 2nd, and so on. The interval between the two occurrences, therefore, is diminishing; at some future day they will be coincident, and in about 21,000 years they will be as far apart again as they now are. The longest and shortest days, and the autumnal equinox, move of course in the same manner as the spring equinox, and consequently the northern and southern hemispheres alternately enjoy a preponderance of summer. The year 1248 A.D. was that in which the first day of winter corresponded with the passage of the earth into perihelion, and consequently was the period when the balance of summer in favour of the northern hemisphere was greatest. Up to that date the duration of summer was increasing; it is now, and has been for 620 years, gradually diminishing.

Astronomers have not, however, generally considered that these changes, or even those which affect the excentricity of our orbit, would produce any material difference between the climates of the two hemispheres, because whatever the excentricity of our orbit may be, the two hemispheres must receive exactly the same amounts of heat, "the proximity of the sun in perigee, or its distance in apogee, exactly compensating the effect of its swifter or slower motion;" in other words, the southern hemisphere has a shorter summer than ours because it is nearer the sun, and for the same reason it receives in a given time more heat, so that the two differences neutralize one another.

M. Adhémar points out, however, that the temperature of each hemisphere does not depend on the quantity of heat received from the sun, but on the difference between the amount received, and the amount radiated away into space; in other words, on the quantity retained. If, he says in illustration, you burn a given quantity of wood in two iden-

tical rooms, and then open the windows in one and not in the other, you will soon have a difference of temperature, though the supply of heat has been the same in both*.

Now our northern hemisphere has $186 \times 24 = 4464$ hours of day in the year, and $179 \times 24 = 4296$ hours of night, while the southern hemisphere has 4464 hours of night, and only 4296 of day. We may admit that the southern hemisphere will receive as much heat from the sun in its 4296 hours of day, as we do in our 4464, but it is evident that it will retain less, because it will have 168 hours more of night, during which radiation will be going on. Though, therefore, the heat received by the two hemispheres will be equal, the temperature of the two will not be by any means the same, and though at first this difference may be slight, it will in its nature be to a certain extent cumulative.

That the southern hemisphere is colder than the northern is evident on account of the much greater accumulation of ice in the former; but it is also clear that this very fact tends to aggravate the difference to which it is due.

Moreover, M. Adhémar affirms that the immense cupola of ice which is known to exist round the South Pole must affect the centre of gravity of the earth, and consequently attract the ocean southwards. In this manner, indeed, he attempts to explain the remarkable preponderance of land in the north, and of sea in the southern hemisphere. A glance at the map will show this difference, but the following table makes it more apparent. Taking each parallel as unity, the proportion of sea is as follows :—

60° North . .	0.353	10° South . .	0.786
50° „ . .	0.407	20° „ . .	0.777
40° „ . .	0.527	30° „ . .	0.791

* Revolutions de la Mer, p. 344.

30° North . .	0.536	40° South . .	0.951
20° „ . .	0.677	50° „ . .	0.972
10° „ . .	0.710	60° „ . .	1.000
0° „ . .	0.771		

Certainly a progressive increase of sea, which is so remarkably regular, can hardly be the result of accident.

M. Adhémar maintains that this is due to the alteration of the centre of gravity of the earth, caused by the great southern cupola of ice, and consequently that 11,120 years ago (i. e. 10,500 years before 1248), when the northern hemisphere was at its coldest, the northern glacier consequently at its maximum, and the southern at its minimum, the preponderance of water would have been in the northern hemisphere, and the submersion of the lower lands of Europe and America may have been due to an alteration, not in the level of the land, but in that of the sea. He conceives that when the increasing cupola counterbalances the decreasing one, there is a sudden transfer of the centre of gravity of the earth from one side of the centre of the solid part to the other, and consequently a rush of water, or deluge, alternately from north to south and from south to north, occurring every 10,500 years. It seems to me, however, that the alterations of the ice cupolas would be too slow, and consequently the change in the centre of gravity too gradual to cause any sudden rush or deluge of water from the one pole to the other.

According to this theory, the year 1248 was that in which our northern hemisphere was at its period of greatest heat, the southern at that of greatest cold; and as 600 years have since elapsed we ought to find some evidence of subsequent change.

As regards the southern hemisphere, M. Adhémar points out that the great southern glacier has considerably retreated

since the time of Captain Cook, but it is in the northern hemisphere that he finds the greatest evidence of alteration. He dwells much on the increase, during the last few centuries, of the Swiss glaciers, and of the ice in Greenland, and points out that the cultivation of the vine does not now extend so far northwards as was once the case. M. Adhémar, then, considers that the last epoch of greatest cold must have been 11,120 years ago, since which time the climate of our hemisphere gradually improved up to the year 1248, when it was most genial, and after which it has, in his opinion, gradually commenced again to deteriorate. Sir Charles Lyell*, however, does not think that this change, "which could hardly produce more than a difference of half a degree Fahrenheit between the cold of the present winter and that of 1248, would be appreciable." He adds that the whole effect which can be produced by secular astronomical changes must "always be very subordinate to the influence of geographical conditions†."

Sir John Herschell‡ also "is very far from supposing it competent" to account for so great an alteration. Moreover it is remarkable as showing how far we are from possessing the data necessary for any satisfactory conclusions, that while, as we have seen, M. Adhémar regards the enormous cupola of ice at the South Pole as the reason for the almost entire absence of land at that Pole, Sir C. Lyell, on the other hand, states as a fact, that the chief cause of the intense cold of high southern latitudes is "the vast height and extent of the Antarctic continent," the very existence of which is denied by, and is indeed incompatible with, the theory of M. Adhémar, while it is necessary to that of Sir C. Lyell.

* Principles of Geology, 1867, vol. i. p. 278.

† Ibid. vol. i. p. 243.

‡ Outlines of Astronomy, 1858, p. 235.

It must, I think, be confessed that the existence of Victoria Land, Enderby's Land, and other coasts, as well as the great volcano of Mount Erebus, are unfavourable to the theory advocated by M. Adhémar, so far at least as he applies it to explain the present remarkable distribution of land and sea; and it must also be remembered, as tending to show that the geographical distribution of land and sea has more influence on climate than M. Adhémar is disposed to admit, that according to his theory the southern hemisphere ought at the present time to be, as a whole, far colder than the northern, which, however, is not the case.

Although, then, there can be no doubt that astronomical changes would, to a certain extent, affect our climate in the manner indicated by M. Adhémar, those best qualified to form an opinion do not consider that the cause assigned by him would by itself be sufficient to account for changes so great as those which have taken place. The effect produced increases, however, with the excentricity of the earth's orbit. The form of this orbit is always altering; as it approaches to a circle, the effect produced by precession and change of position of perihelion diminishes, while on the other hand it increases as the orbit elongates. At present the excentricity of our orbit is only 0.0168,—that is to say, the orbit is nearly circular; but there have been periods when it was much more elongated, and when consequently the extremes of temperature dependent on precession and the position of perihelion must also have been much greater.

Mr. Croll and Mr. Stone have calculated the excentricity for the last million years, and Mr. John Carrick Moore has worked out the effect upon our climate, assuming other things to remain unchanged, in the four last columns of the following table which is given by Sir C. Lyell in the last edition of the "Principles of Geology *."

* l. c. vol. i. p. 293.

Table showing the variations in the excentricity of the earth's orbit for a million years before A.D. 1800, *and some of the climatal effects of such variations.*

	1 Number of years before A.D. 1800.	2 Excentricity of Orbit.	Difference of distance in millions of miles.	4 Number of winter days in excess.	5 Mean of hottest month in lat. of London.	6 Mean of coldest month in lat. of London.
	1,000,000	.0151	2¾	7.3	83°F.	21°F.
D	950,000	.0517	9½	25.1	109°	3°
	900,000	.0102	1¼	4.9	80°	23°
C *a*	850,000	.0747	13⅓	36.4	126°	7°
C *b*	800,000	.0132	2¼	6.4	82°	22°
C *c*	750,000	.0575	10½	27.8	113°	0°6
	700,000	.0220	4	10.2	87°	17°
	650,000	.0226	4	11	88°	16°
	600,000	.0417	7½	20.3	101°9	7°9
	550,000	.0166	3	8	84°	20°
	500,000	.0388	7	18.8	99°	9°
	450,000	.0308	5½	15	94°	13°
	400,000	.0170	3	8.2	84°	20°
	350,000	.0195	3½	9.5	86°	18°
	300,000	.0424	7¾	20.6	102°	7°
	250,000	.0258	4½	12.5	90°	15°
B *a*	210,000	.0575	10½	27.8	113°	0°7
B *b*	200,000	.0567	10¼	27.7	113°	1°9
	150,000	.0332	6	16.1	95°	12°
A	100,000	.0473	8½	23	105°	5°
	50,000	.0131	2¼	6.3	82°	22°
	0	.0168	3	8.1	84°	20°

EXPLANATION OF THE TABLE.

COLUMN 1.—Division of a million years preceding 1800 into twenty equal parts.

COLUMN 2.—Computed by Mr. James Croll, by aid of Leverrier's formula, gives the excentricity of the earth's orbit, in parts of a unit equal to the mean distance, or half the longer diameter of the ellipse.

COLUMN 3.—Which, together with the three following columns, has been computed by Mr. John Carrick Moore, gives in millions of miles the difference between the greatest and least distances of the earth from the sun, during the excentricities given in Column 2.

COLUMN 4.—Gives the number of days by which winter, occurring in aphelion, is longer than the summer in perihelion.

COLUMN 5.—Gives the mean temperature of the hottest summer month in the latitude of London when the summer occurs in perihelion.

COLUMN 6.—Gives the mean temperature of the coldest winter month in the latitude of London when the winter occurs in aphelion.

This table shows that there are four periods marked A, B, C, and D, in which there has been a large excentricity, and an extreme climate. The periods marked A and B, says Sir Charles Lyell, "would not, I conceive, be sufficiently distant from our era to afford time for that series of glacial and post-glacial events which we can prove to have happened since the epoch of the greatest cold. These events relate to changes in the level of the land in opposite directions, as well as the excavation of valleys, and variations in the range and distribution of aquatic and terrestrial animals, all of which take place at so slow a rate that 200,000 years would not be sufficient to allow of the series of changes with which we are acquainted. I agree, therefore, with Mr. Croll, that if the date of the most intense glacial cold can be arrived at by aid of a very large excentricity, it would be a more probable conjecture to assign C than B as the period in question, "in other words, to regard the glacial epoch as representing a period 800,000 years ago."

In differing from such a great authority as Sir C. Lyell, I do so with great diffidence, but I confess that I should be disposed rather to assign the glacial era to the periods A and B, than to either C or D*.

It seems to me unlikely that the present fauna of Europe should have continued to exist, almost without alteration, for so long a period as 800,000 years, and the "variations in the range and distribution of aquatic and terrestrial animals," might, I think, have occurred in even less than 200,000 years under the great changes in climate which have taken place. Moreover the Geological Magazine for June, 1868, contains an interesting paper by Mr. Geikie, "On denudation now in progress," in which he discusses the general effect produced by rivers in excavating valleys and lowering the general level

* In a recent memoir, Mr. Croll also expresses this opinion. Phil. Mag. 1868, p. 367.

of the country. "For it is clear that if a river carries so many millions of cubic feet of sediment every year into the sea, the area of the country drained by it must have lost that quantity of solid material, and if we could restore the sediment so as to spread it over the basin, the layer so laid down would represent the fraction of a foot by which the basin had been lowered during a year." From observations made on the Mississippi, Ganges, Rhone, Danube, and other great rivers, Mr. Geikie estimates the annual loss at $\frac{1}{6000}$ of a foot. But he points out that this would not be uniform. The plains and watersheds would lose little, the slopes and valleys much. "There can be no doubt," he says, "that the erosion of the slopes and watercourses is very much greater than that of the more level grounds. Let it be assumed that the waste is nine times greater in the one case than in the other (in all likelihood it is more): in other words, that while the plains and table-lands have been having one foot worn off their surface, the declivities and river-courses have lost nine feet. Let it be further assumed that one-tenth part of the surface of a country is occupied by its water-courses and glens, while the remaining nine-tenths are covered by the plains, wide valleys, or flat grounds. Now, according to the foregoing data, the mean annual quantity of detritus carried to the sea is equal to the yearly loss of $\frac{1}{6000}$ of a foot from the general surface of the country. The valleys, therefore, are lowered by $\frac{1}{1800}$ of a foot, and the more open and flat land by $\frac{1}{10800}$ of a foot."

Mr. Geikie calculates in this manner that Europe would disappear in little more than 4,000,000 of years. I cannot altogether accept this conclusion, for when a river has less than a given amount of fall, it ceases to excavate. Thus the effect of the Nile is to raise, not to lower the level of Egypt, and most of our large rivers near their mouths act in a somewhat similar manner. As regards the higher districts, how-

ever, his data are perhaps not far wrong, and if we apply them to the valley of the Somme, where the excavation is about 200 feet in depth, they would indicate an antiquity for the Palæolithic epoch of from 100,000 to 240,000 years, which, though arrived at from perfectly different data, agrees with the periods A and B in the calculation made by Messrs. Croll and Stone.

In addition to the causes already alluded to, there is at least one other astronomical phenomenon, namely, the change in the obliquity of the ecliptic, which must be taken into account in considering the effects which cosmical causes may, or must, have exercised on climate. The whole question then is one, not only of extreme interest, but also of very great difficulty, and we are not, I think, at present in a position to estimate with confidence the effects on climate which may have been produced by these various causes.

Several other points connected with the glacial period would receive a natural explanation if we were able to adopt the suggestions of M. Adhémar and Mr. Croll. Thus M. Morlot* some years ago pointed out that there are in Switzerland evidences of two periods of cold, during what is called the glacial epoch, separated by an interval of mildness.

Whether M. Adhémar is right in attributing the preponderance of ocean in the southern hemisphere to the influence of the great Antarctic glacier, cannot, I think, in the present state of our knowledge, be conclusively determined. There can, however, be no doubt that an accumulation of snow and ice at one pole would, by affecting the position of the centre of gravity of the earth, attract the waters towards that pole. Mr. Croll calculates that a diminution of 470 feet in the thickness of the Antarctic glacier would raise the sea level at the North Pole 26 feet 5 inches, and 25 feet at the lati-

* Bull. de la Soc. Vaudoise des Sciences Naturelles. March, 1854. Bibl. Universelle de Geneve. May, 1858.

tude of Glasgow. A mile of ice removed in the same way would produce a change of 280 feet. M. Adhémar dwells on various considerations which induce him to attribute a very great thickness to the great southern glacier, and consequently he considers that the alterations of sea-level which would result from the alternate preponderance of ice in the Arctic and Antarctic regions, would account for the various alterations in the distribution of land and water. That there must, however, have been elevations and depressions of the land itself is sufficiently evident from other considerations, but it is impossible to deny that the cause pointed out by M. Adhémar may have produced the relative elevation of the sea, as proved by the various raised beaches which fringe our shores, and the depression on the other hand indicated by the submerged forests, observed at so many points.

The former would indicate the periods of cold, the latter those of heat. The present condition of our rivers will also thus be simply explained. There can, I think, be no doubt that many of them have excavated their own valleys. At present, however, they are all filling up the lower parts of the excavation, as, for instance, we have seen to be the case with the Somme.

Moreover, the bottom of these valleys is in most cases lower than the present sea-level, which cannot have been the case at the time when they were excavated. It is evident, then, that the excavation must have been finished at the time when the sea was at a lower relative level than at present.

Again, it will be remembered that side by side with the remains of Arctic animals have been found others indicating a warm climate, such for instance as the hippopotamus. This fact, which has always hitherto been felt as a difficulty, is at once explained by Mr. Croll's suggestion, for, when the excentricity was at a high value, we should have a

change every ten or twelve thousand years from a high to a low temperature, and *vice versâ*. But a period of ten thousand years, long as it may appear to us, is very little from a geological point of view; and we can thus understand how the remains of the hippopotamus and the musk ox come to be found together in England and France. The very same astronomical conditions which fitted our valleys for the one, would at an interval of ten thousand years render them suitable for the other.

Sir C. Lyell has also * attempted to form an estimate of the duration of the glacial epoch, on the assumption that the different movements of elevation and depression proceeded at an average rate of 2½ feet in a century. As the simplest "series of changes in physical geography which can possibly account for the phenomena of the glacial period," he gives the following:—

"First, a continental period, towards the close of which the forest of Cromer flourished: when the land was at least 500 feet above its present level, perhaps much higher, and its extent probably greater than that given in the map, fig. 41." In this map the British Isles, including the Hebrides, Orkneys, and Shetlands, are connected with one another and with the continent, the whole German. Ocean being laid dry.

"Secondly, a period of submergence, by which the land north of the Thames and Bristol Channel, and that of Ireland, was gradually reduced to such an archipelago as is pictured in map, fig. 40; and finally to such a general prevalence of sea as is seen in map, fig. 39, only the tops of the mountains being left above water. This was the period of great submergence and of floating ice, when the Scandinavian flora, which overspread the lower grounds during the first continental period, may have obtained exclusive

* Antiquity of Man, pp. 282, 285.

possession of the only lands not covered with perpetual snow.

"Thirdly, a second continental period, when the bed of the glacial sea, with its marine shells and erratic blocks, was laid dry, and when the quantity of land equalled that of the first period."

It is evident that such changes as these would require a great lapse of time. Sir Charles Lyell admits that the average change of 2½ feet in a century is a purely arbitrary and conjectural rate, and that there are cases in which a change of as much as six feet in a century appears to have taken place: still it is in his opinion probable that the rate assumed in a century is, if any thing, above the average; and in this I believe most geologists would be disposed to agree with him. On this hypothesis the submergence of Wales, to the extent of 1400 feet, would require 56,000 years; but "taking Prof. Ramsay's estimate of 800 feet more, that elevation being required for the deposition of some of the stratified drift, we must demand an additional period of 32,000 years, amounting in all to 88,000; and the same time would be required for re-elevation of the tract to its present height. But if the land rose in the second continental period no more than 600 feet above the present level, this . . . . . would have taken another 24,000 years; the whole of the grand oscillation, comprising the submergence and re-emergence, having taken, in round numbers, 224,000 years for its completion; and this, even if there were no pause or stationary period, when the downward movement ceased, and before it was converted into an upward one."

To the geologist, however, these figures, large as they are, will have no appearance of improbability. All the facts of geology tend to indicate an antiquity of which we are but beginning to form a dim idea. Take, for instance, one

single formation—our well-known chalk. This consists entirely of shells and fragments of shells deposited at the bottom of an ancient sea, far away from any continent. Such a progress as this must be very slow: probably we should be much above the mark if we were to assume a rate of deposition of ten inches in a century. Now the chalk is more than a thousand feet in thickness, and would have required therefore more than 120,000 years for its formation. The fossiliferous beds of Great Britain, as a whole, are more than 70,000 feet in thickness, and many which with us measure only a few inches, on the continent expand into strata of immense depth; while others of great importance elsewhere are wholly wanting with us, for it is evident that during all the different periods in which Great Britain has been dry land, strata have been forming (as is, for example, the case now) elsewhere, and not with us. Moreover, we must remember that many of the strata now existing have been formed at the expense of older ones; thus all the flint gravels in the south-east of England have been produced by the destruction of chalk. This again is a very slow process. It has been estimated that a cliff 500 feet high will be worn away at the rate of an inch in a century. This may seem a low rate, but we must bear in mind that along any line of coast there are comparatively few points which are suffering at one time, and that even on those, when a fall of cliff has taken place, the fragments serve as a protection to the coast until they have been gradually removed by the waves. The Wealden Valley is twenty-two miles in breadth, and on these data it has been calculated that the denudation of the Weald must have required more than 150,000,000 of years.

There can be no doubt about the interest of these calculations, and they have also the great merit of giving some definiteness to our ideas. We must not, however, attribute

to them a value which has been distinctly disclaimed even by their authors. "Dans tous les cas," says M. Morlot, "il doit être bien entendu que l'auteur n'expose le présent calcul que comme une première imparfaite et hasardeuse tentative, sans valeur absolue en elle-même, tant qu'elle n'aura pas été verifiée au moyen d'autres essais du même genre." Moreover, we must remember that these estimates are brought forward not as a proof, but as a measure, of antiquity. Our belief in the antiquity of man rests not on any isolated calculations, but on the changes which have taken place since his appearance; changes in the geography, in the fauna, and in the climate of Europe. Valleys have been deepened, widened, and partially filled up again; caves through which subterranean rivers once ran are now left dry; even the configuration of land has been materially altered, and Africa finally separated from Europe.

Our climate has greatly changed for the better, and with it the fauna has materially altered. In some cases, for instance, in that of the hippopotamus and of the African elephant, we may probably look to the diminution of food and the presence of man as the main cause of their disappearance; the extinction of the mammoth, the *Elephas antiquus*, and the *Rhinoceros tichorhinus*, may possibly be due to the same influences; but the retreat of the reindeer and the musk ox are probably in great measure owing to the change of climate. These and similar facts, though they afford us no means of measurement, impress us with a vague and overpowering sense of antiquity. All geologists, indeed, are now prepared to admit that man has existed on our earth for a much longer period than was until recently supposed to have been the case.

But it may be doubted whether even geologists yet realize the great antiquity of our race.

"When speculations on the long series of events which

occurred in the glacial and post-glacial periods are indulged in," says Sir C. Lyell*, "the imagination is apt to take alarm at the immensity of the time required to interpret the monuments of these ages, all referable to the era of existing species. In order to abridge the number of centuries which would otherwise be indispensable, a disposition is shown by many to magnify the rate of change in pre-historic times, by investing the causes which have modified the animate and the inanimate world with extraordinary and excessive energy.

. . . . . We of the living generation, when called upon to make grants of thousands of centuries, in order to explain the events of what is called the modern period, shrink naturally at first from making what seems so lavish an expenditure of past time."

That man existed in Western Europe during the period of the Mammoth and the Rhinoceros tichorhinus, no longer, I think, admits of a doubt; but when we come to Pliocene, and still more to Miocene, times, the evidence is less conclusive.

M. Desnoyers† has called attention to some marks noticed by him on bones found in the upper pliocene beds of St. Prest, and belonging to the *Elephas meridionalis, Rhinoceros leptorhinus, Hippopotamus major,* several species of deer (including the gigantic *Megaceros carnutorum,* Laugel), and two species of *Bos.* M. Desnoyers has examined a considerable number of these bones, and he comes to the conclusion "que les traces d'incisions, ... en un mot, que des traces tout à fait analogues à celles que produiraient les outils de silex tranchants à point plus ou moins aiguë, à bords plus ou moins dentelés, se voyaient sur la plupart de ces ossements."

Among the bones of the deer were several crania, all of which have been broken in one way, namely, by a violent

* Address to the Brit. Ass. 1864, p. 21, Bath.

† Comptes Rendus. June 8, 1863.

blow given on the skull between, and at the base of, the horns. M. Steenstrup has noticed fractures of this kind in other less ancient skulls of ruminants, and at the present day some of the northern tribes treat the skulls of ruminants in the same manner. Through the courtesy of M. Desnoyers, I have had the opportunity of examining some of the scratched bones from Saint Prest. The markings fully bear out the description given by him, and some of them at least appear to me to be probably of human origin; at the same time, and in the present state of our knowledge, I am not prepared to say that there is no other manner in which they might have been produced. At the same place that indefatigable archæologist, M. l'Abbé Bourgeois, has more recently discovered worked flints, including flakes, awls, and scrapers, but unfortunately there is some doubt as to the stratigraphical relations of the bed in which they occurred*.

At the meeting in Spezzia, of the "Societé Italienne des Sciences Naturelles," Prof. G. Ramorino exhibited some bones of Pliocene Age, said to bear marks of knives. These specimens are in the museum at Genoa, but I have not myself seen them†.

Some archæologists even consider that we have proof of the presence of man in miocene times. Thus M. Bourgeois has found in the calcaire de Beauce, near Pontlevoy, many flints which have been subjected to the action of heat, and others which he considers to show undoubted marks of human workmanship. On the former point there is still some difference of opinion, and the action of fire, though it points strongly to, does not absolutely prove, the presence of man. These interesting specimens were found in a stratum, which contains the remains of Acerotherium, an extinct animal allied to the Rhinoceros, and beneath a bed which contains the

* Mat. pour l'Histoire de l'Homme, 1867, p. 17.

† l. c. vol. ii. p. 41.

Mastodon, Dinotherium, and Rhinoceros. M. Bourgeois gives the following section *:—

Vegetable earth	0m	30
,, ,, mixed with quaternary pebbles		20
Faluns, with shells and rolled bones of Rhinoceros, Mastodon, and Dinotherium		60
Compact calcaire de Beauce perforated by Pholas		30
Marly calcaire de Beauce	6	
Layer containing worked flints . .		60

In the Matériaux pour l'Histoire de l'Homme for 1870 †, is a figure of a flint flake found by M. Tardy in the miocene beds of Aurillac (Auvergne), together with the remains of Dinotherium giganteum, and Machairodus latidens. Not having visited the locality, I cannot, of course, express any opinion as to the age of the bed in which this interesting specimen was discovered, but from the figure given there can be no reasonable doubt that it is of human workmanship. M. Delaunay also has called attention to a rib, found by him at Pouancé (Maine et Loire) and belonging to a well-known miocene species, the Halitherium fossile ‡; this bears certain marks which closely resemble those which might have been made by flint implements. M. Harny gives a good figure of this interesting specimen. Whether, however, we have conclusive evidence of the existence of man in miocene times is a question on which archæologists are still of different opinions.

Sir Charles Lyell himself thinks that we may expect to find the remains of man in the pliocene strata, but there he draws the line, and says that in miocene time, "had some

* Mat. pour l'Histoire de l'Homme, 1869, p. 297. † l. c. p. 93.
‡ Précis de Paléontologie Humaine, p. 58.

other rational being, representing man, then flourished, some signs of his existence could hardly have escaped unnoticed, in the shape of implements of stone or metal, more frequent and more durable than the osseous remains of any of the mammalia."

Without expressing any opinion as to the mental condition of our ancestors in the miocene period, it seems to me evident that the argument derived from the absence of human remains, whatever may be its value, is as applicable to pliocene as to miocene times. But those who have learnt geology at the feet of Sir Charles Lyell, and look up to him as their master in the science, will be the least able to agree with him on this point, for the imperfection of the geological record has hitherto been urged upon us almost as strongly by Sir C. Lyell as by Mr. Darwin. It is true that few of our existing species, or even genera, have as yet been found in miocene strata; but if man constitutes a separate family of mammalia, as he does in the opinion of the highest authorities, then, according to all palæontological analogies, he must have had representatives in miocene times. We need not, however, expect to find the proofs in Europe; our nearest relatives in the animal kingdom are confined to hot, almost to tropical climates, and it is in such countries that we are most likely to find the earliest traces of the human race.

CHAPTER XIII.

MODERN SAVAGES.

ALTHOUGH our knowledge of ancient times has of late years greatly increased, it is still very imperfect, and we cannot afford to neglect any possible source of information. It is evident that history cannot throw much light on the early condition of man, because the discovery—or, to speak more correctly, the use—of metal has in all cases preceded that of writing. Even as regards the Age of Bronze we derive little information from History, and although, as we have seen, the Age of Stone is vaguely alluded to in the earliest European writers, their statements have generally been looked upon as imaginative rather than historical; and contain, indeed, little more than the bare statement that there was a time when metal was unknown.

Nor will tradition supply the place of history. At best it is untrustworthy and short-lived. Thus in 1770 the New Zealanders had no recollection of Tasman's visit*. Yet this took place in 1643, less than 130 years before, and must have been to them an event of the greatest possible importance and interest. In the same way the North American Indians soon lost all tradition of De Soto's expedition, although "by its striking incidents it was so well suited to impress the Indian mind†."

Even as regards events which are contemporary, or nearly so, we find that the accounts given by savages become

* Cook's First Voyage round the World. Hawkesworth's Voyages, vol. ii. p. 388.

† Schoolcraft's Indian Tribes, vol. ii. p. 12.

rapidly distorted. Thus Nilsson* quotes the account given by Mackenzie, that the Esquimaux described the English to him as being giants, with wings, who could kill with a glance of their eye, and swallow a whole beaver at a mouthful. So also Colonel Dalton tells us that "though the Kols have known the English for little more than half a century, they assign to them a most honourable place in their genesis. The Assam Abors and Garrows do the same†."

The Bungogees and Pankhos (Hill tribes of Chittagong) believe that their ancestors came out of a cave in the earth, under the guidance of a chief named Tlandrokpah, who was so powerful that he married the daughter of the Deity, to whom he presented his gun. "You can still hear the gun, the thunder is the sound of it‡." In this case the mention of the gun shows that the tradition must be of modern origin. Again, Speke says, "I found that the Waganda have the same absurd notion here as the Wanyambo have in Karagŭé, of Kamrasi's supernatural power in being able to divide the waters of the Nile in the same manner as Moses did the Red Sea§."

Mansfield Parkyns relates how it was firmly believed in the remote parts of Abyssinia, that the German missionaries had, "in the course of only a few days, perforated a tunnel all the way (from Adowa) to Massowa, on the coast of the Red Sea, a distance of above a hundred and fifty miles, whence they were to obtain large supplies of arms, ammunition, etc.‖."

Baker¶ also, in his Nile Tributaries, says: "The conver-

* The Stone Age. English edition, p. 209.

† Trans. Eth. Soc. New Ser. vol. vi. p. 38. See also Lichtenstein's Travels, vol. i. p. 290; James' Expedition to the Rocky Mountains, vol. iii. p. 247; and Campbell, Trans. Ethn. Soc. 1870, p. 335.

‡ Capt. Lewin, The Hill Tribes of Chittagong. Calcutta, 1869, p. 95. See also Lichtenstein's Travels, vol. i. p. 290.

§ Speke, p. 438. See also p. 504.

‖ Life in Abyssinia, p. 151.

¶ l. c. p. 129, 130.

sation of the Arabs is in the exact style of the Old Testament. The name of God is coupled with every trifling incident in life, and they believe in the continual action of Divine special interference. Should a famine afflict the country, it is expressed in the stern language of the Bible, 'The Lord has sent a grievous famine upon the land;' or, 'The Lord called for a famine, and it came upon the land.' Should their cattle fall sick, it is considered to be an affliction by Divine command; or should the flocks prosper and multiply particularly during one season, the prosperity is attributed to special interference. Nothing can happen in the usual routine of daily life, without a direct connexion with the hand of God, in the Arab's belief.

"This striking similarity to the description of the Old Testament is exceedingly interesting to a traveller when residing among these curious and original people. With the Bible in one hand, and these unchanged tribes before the eyes, there is a thrilling illustration of the sacred record: the past becomes the present, the veil of three thousand years is raised, and the living picture is a witness to the exactness of the historical description. At the same time, there is a light thrown upon many obscure passages in the Old Testament by the experience of the present customs and figures of speech of the Arabs, which are precisely those that were practised at the periods described. I do not attempt to enter upon a theological treatise, therefore it is unnecessary to allude specially to these particular points. The sudden and desolating arrival of a flight of locusts, the plague, or any other unforeseen calamity, is attributed to the anger of God, and is believed to be an infliction of punishment upon the people thus visited, precisely as the plagues of Egypt were specially inflicted upon Pharaoh and the Egyptians. Should the present history of the country be written by an Arab scribe, the style of the description

would be purely that of the Old Testament, and the various calamities or the good fortunes that have in the course of nature befallen both the tribes and individuals, would be recounted either as special visitations of Divine wrath, or blessings for good deeds performed. If in a dream a particular course of action is suggested, the Arab believes that God has *spoken* and directed him. The Arab scribe, or historian would describe the event as the '*voice* of the Lord' (Kallam el Allah) having spoken unto the person; or, that God appeared to him in a dream and '*said*.' Thus much allowance would be necessary on the part of a European reader for the figurative ideas and expressions of the people."

Although, then, traditions and myths are of great importance, and indirectly throw much light on the condition of man in ancient times, we must not expect to learn much directly from them. At any rate, as regards the Stone Age in Europe both history and tradition are silent, and here, as in all long civilized countries, stone weapons and arrow-heads are regarded as thunderbolts or "Elfin" arrows.

Deprived, therefore, as regards this period, of any assistance from history, but relieved at the same time from the embarrassing interference of tradition, the archæologist is free to follow the methods which have been so successfully pursued in geology—the rude bone and stone implements of bygone ages being to the one what the remains of extinct animals are to the other. The analogy may be pursued even farther than this. Many mammalia which are extinct in Europe have representatives still living in other countries. Much light is thrown on our fossil pachyderms, for instance, by the species which still inhabit some parts of Asia and Africa; the secondary marsupials are illustrated by their existing representatives in Australia and South America; and in the same manner, if we wish clearly to

understand the antiquities of Europe, we must compare them with the rude implements and weapons still, or until lately, used by the savage races in other parts of the world. In fact, the Van Diemaner and South American are to the antiquary what the opossum and the sloth are to the geologist.

A certain space, therefore, devoted to the consideration of the modern savages will not be out of place in this work; and though it would require volumes to do justice to the subject, still it may be possible to bring together a certain number of facts which will throw light on the ancient remains found in Europe, and on the condition of the early races which inhabited our continent. In order, however, to limit the subject as much as possible, I propose, with one exception, to describe only the "non-metallic savages" (if such an expression may be permitted) and even of these, only some of the most instructive, or of those which have been most carefully observed by travellers.

It is a common opinion, that savages are, as a general rule, only the miserable remnants of nations once more civilized; but although there are some well-established cases of national decay, there is no scientific evidence which would justify us in asserting that this applies to savages in general. No doubt there are instances in which nations, once progressive, have not only ceased to advance in civilization, but have even fallen back. Still, if we compare the accounts of early travellers with the state of things now existing, we shall find no evidence of any general degradation. The Australians, Bushmen, and Fuegians lived when first observed almost exactly as they do now. In some savage tribes we even find traces of improvement; the Bachapins, when visited by Burchell, had just introduced the art of working in iron; the largest erection in Tahiti was constructed by the generation living at the time of Captain Cook's visit, and the prac-

tice of cannibalism had been recently abandoned*; the largest Mexican temple was built only six years before the discovery of America; in the north of Australia, McGillivray tells us that the rude bark canoes which were formerly in general use, have been quite superseded by those dug out of the trunk of a tree; again, outriggers are said to have been recently adopted by the Andaman Islanders; and if certain races, as for instance some of the American tribes, have fallen back, this has, I think, been due, less to any inherent tendency than to the injurious effect of European influence. Moreover, if the Cape of Good Hope, Australia, New Zealand, etc., had ever been inhabited by a race of men more advanced than those whom we are in the habit of regarding as the aborigines, some evidence of this would surely have remained; and this not being the case, none of our travellers having observed any ruins, or other traces of a more advanced civilization, there does not appear to be any sufficient reason for supposing that these miserable beings are at all inferior to the ancestors from whom they are descended.

The Hottentots.

Speaking generally, we may say that the use of metal has been long known throughout Europe, Asia, and Africa, while in America, in Australia, and in the Oceanic Islands, all implements and weapons were, until within the last three hundred years, made of wood, bone, stone, or other similar materials.

The semi-civilized nations of Central America formed, indeed, a striking exception to the rule, since they were acquainted with the use of bronze. The North American Indians also had copper hatchets, but these were simply

* Forster, Observations made during a Voyage round the World, p. 327. See also Ellis, Polynesian Researches, vol. ii. p. 29.

hammered into shape, without the assistance of heat. Here, therefore, we seem to get a glimpse of the manner in which our ancestors may have acquired the knowledge of metal. No doubt the possession of iron generally marks a great advance in civilization; still the process is very gradual, and there are some nations which, though provided with metal implements, are nevertheless but little removed from a state of barbarism.

Thus the Hottentots, who were not only acquainted with the use, but even with the manufacture, of iron, and who possessed large numbers of sheep and cattle, were yet in many respects among the most disgusting of savages. Even Kolben, who generally takes a favourable view of them, admits that they are, in his opinion, the filthiest people in the world*. We might go farther, and say the filthiest animals; I think no species of mammal could be fairly compared with them in this respect. Their bodies were covered with grease, their clothes were never washed, and their hair was loaded "from day to day with such a quantity of soot and fat, and it gathers so much dust and other filth, which they leave to clot and harden in it, for they never cleanse it, that it looks like a crust or cap of black mortar†." They wore a skin over the back, fastened in front. They carried this as long as they lived, and were buried in it when they died. Their only other garment was a square piece of skin, tied round the waist by a string, and left to hang down in front. In winter, however, they sometimes used a cap. For ornaments they wore rings of iron, copper, ivory, or leather. The latter had the advantage of serving for food in bad times.

Their huts were generally oval, about fourteen feet by ten in diameter, and seldom more than four or five in

* Kolben's History of the Cape of Good Hope, vol. i. p. 47.
† Kolben, l.c. p. 188.

height. They were made of sticks and mats. The sticks were fastened into the ground at both ends, or, if not long enough, two were placed opposite to one another, and secured together at the top. One end of the hut was left open to form the door. The mats were made of bulrushes and flags dried in the sun, and so closely fitted together that only the heaviest rain could penetrate them*. "With respect to household furniture," says Thunberg†, "they have little or none. The same dress that covers a part of their body by day, serves them also for bedding at night." Their victuals are boiled in leathern sacs and water, by means of heated stones, but sometimes in earthen pots‡. Milk is kept in leathern sacs, bladders of animals, and baskets made of platted rushes, perfectly watertight. These, a tobacco pouch of skin, a tobacco pipe of stone or wood, and their weapons, constitute the whole catalogue of their effects. According to Kolben, they sometimes broiled their meat, sometimes boiled it in blood, to which they often added milk; "this they look on as a glorious dish." They were, however, both filthy and careless about their cookery, and the meat was often eaten half putrid, and more than half raw§.

Their weapons consisted of bows and poisoned arrows, spears, javelins or assagais, stones, and darting-sticks or "kirris," about three feet long and an inch thick. With these weapons they were very skilful, and feared not to attack the elephant, the rhinoceros, or even the lion. Large animals were also sometimes killed in pitfalls, from six to eight feet deep, and about four feet in diameter. They fixed a strong pointed stake in the middle. "Into this hole an elephant falling with his fore-feet (it is not of dimensions to receive his whole body), he is pierced in the neck and

* Thunberg, Pinkerton's Travels, vol. xvi., p. 33; Kolben, l.c. p. 221; Sparrman, vol. i., p. 195.

† Page 141.

‡ This, however, they appear to have learnt from the Europeans.

§ Thunberg, p. 141; Kolben, p. 203; Harris, Wild Sports of Africa, p. 142.

breast with the stake and there held securely*," for the more he struggled the farther it penetrated. They caught fish both with hooks and in nets. They also ate wild fruits and roots of various kinds, which, however, they did not take the trouble to cultivate.

For domestic animals the Hottentots had oxen, sheep, and dogs. It might have naturally been supposed that oxen were used in the same manner all over the world. They seem evidently adapted either for draught or for food. With the dog the case is different; we ourselves use him in various ways, and one feels therefore the less surprise at the different services which he performs for different races of savages. But even with regard to cattle the same was the case; besides what we may call their normal uses, the Veddahs, or wild inhabitants of Ceylon, used oxen in hunting; and the Hottentots trained some to serve as what we may call sheep-oxen, or cow-oxen,—that is to say, to guard and manage the flocks and herds,—and others as war-oxen, a function which might have been considered as opposed to the whole character of the beast, but in which, nevertheless, they appear to have been very useful.

The Hottentots of late years not only used iron weapons, but even made such for themselves. The ore was smelted in the following manner†: "They make a hole in a raised ground, large enough to contain a good quantity of ironstones, which are found here and there in plenty in the Hottentot countries. In this hole they melt out the iron from the ore. About a foot and a half from this hole, upon the descent, they make another, something less. This is the receiver of the melted iron, which runs into it by a narrow channel they cut from one hole to the other. Before they put the ironstones into the hole where the iron is to be smelted out of them, they make a fire in the hole, quite up

* Kolben, p. 250. † Kolben, l.c. p. 239.

to the mouth of it, in order to make the earth about it thoroughly hot. When they suppose the earth about it is well heated, they fill the hole almost up with ironstones. They then make a large fire over the stones, which they supply from time to time with fuel, till the iron is melted and all of it is run into the receiver. As soon as the iron in the receiver is cold, they take it out, and break it to pieces with stones. These pieces the Hottentots, as they have occasion, heat in other fires, and with stones beat 'em out and shape 'em to weapons. They rarely make any thing else of iron."

The Hottentot customs, some of which are extremely curious, are fully described by Thunberg*, Kolben†, Cork‡, Sparrman§, and other travellers. Whether the Hottentots can be said to have had any religion‖, depends upon the exact meaning we attach to the word. Though they seem to have had some notion of a Deity, even Kolben admits that they had not "any institution of worship." The older writers, indeed, consider certain dances as being religious ceremonies. This was stoutly denied by the natives themselves¶, in spite of which Kolben assures us that they *were* "acts of religion," adding candidly, "let the Hottentots say what they will." They are very fond of smoking, and are great drunkards. It is only fair to say that Kolben gives them a good character for integrity, chastity, fidelity, and liberality, assuring us that they "are certainly the most friendly, the most liberal, and the most benevolent people to one another that ever appeared upon earth**." Other travellers also speak of them in very high terms††. At the same time it is difficult

* l. c. pp. 141, 142.

† Pp. 113, 115, 118, 121, 153, 252.

‡ Hawkesworth's Voyages, vol. iii., p. 791.

§ Vol. i. p. 357.

‖ Thunberg, l. c. p. 141, etc.; Kolben, pp. 37, 93, etc. Beeckman thought they had no religion at all. Pinkerton's Voyages, vol. ii. p. 153; so also, Harris, Wild Sports of Africa, p. 160; Sparrman, vol. i. p. 207.

¶ Sparrman, vol. i. p. 212; Kolben, l. c.

** l. c. p. 334.

†† See, for instance, Philips' South Africa, pp. 4, 5, 6.

to see how these statements can be reconciled with the admitted fact that, as soon as any man or woman is so enfeebled by old age that he or she is unable to work, and can "no longer"—I am quoting from Kolben himself—"be of any manner of service in any thing, they are thrust out of the society and confined to a solitary hut at a considerable distance from the kraal, there, with a small stock of provisions placed within their reach, but without any one to comfort or assist 'em, to die either of age or hunger, or be devoured by some wild beast*." This, it must be remembered, was no exceptional atrocity, but a general custom, and applied to the rich as well as the poor, for if an old man had property it was taken away from him. Infanticide, again, was very common among them, and was not regarded as a crime. Girls were generally the victims, and if a woman had twins, the ugliest of them was almost always exposed or buried alive. This was done with the consent of "the whole kraal, which generally allows it without taking much pains to look into it†." The poverty and the hardships which they had to undergo may perhaps plead as some excuse for these two unnatural customs.

The Bushmen resembled the Hottentots in many things, but were even more uncivilized. They had no knowledge of metallurgy, no domestic animals, and no canoes. They frequently stole the cattle of their more advanced neighbours, but always killed and ate them as quickly as possible. Their principal weapons were bows and poisoned arrows. Lichtenstein asserts that they had no names‡, but this was probably an error. Bleek regards them as the lowest of human races, and Haeckel even goes so far as to assert that they seem "to the unprejudiced comparative student of

* l. c. p. 321.
† l. c. p. 144.
‡ Lichtenstein's Travels in Southern Africa, vol. i. p. 192.

nature, to manifest a closer connexion with the gorilla and chimpanzee than with a Kant or a Goëthe*."

The Veddahs.

The Veddahs, or wild tribes who inhabit the interior of Ceylon, have been described by Knox†, Tennant‡, and Bailey§. They live in huts very rudely formed of boughs and bark, and cultivate small patches of chena, but subsist principally on honey and the produce of the chase. Their weapons consist of axes and bows and arrows. With the latter they are not very skilful, as they pursue only the larger game, and the art of hunting consists in creeping close up to their prey and taking it unawares. They are very good deer-stalkers, and, besides excellent dogs, have also hunting buffaloes. These are so trained that they are easily guided by a string tied round the horn, and are used at night. The buffalo feeds, the man crouches behind him, and thus, unseen and unsuspected, steals upon his prey.

They have no pottery, and their cooking is very primitive. They wear scarcely any clothes, nothing in fact but a scrap of dirty rag, supported in front by a string tied round the waist. Perhaps the women's cloth is a trifle larger than the men's, but that appears to be the only difference. They are very dirty, and very small; the ordinary height of the men being from four feet six to five feet one, and of the women from four feet four to four feet eight. Mr. Bailey thinks that it would be impossible to conceive more barbarous specimens of the human race. Davy even asserts that they have no names, and do not bury the dead.

* On the Origin of Language, by W. H. J. Bleek. Edited by Dr. E. Haeckel, pp. 4, 5.

† An Historical Relation of Ceylon. 1681.

‡ Ceylon.

§ Transactions of the Ethnological Society. New Ser. Vol. ii. p. 278. See also Davy's Ceylon.

They have, however, one remarkable peculiarity which it would be unfair to omit. They are kind, affectionate, and constant to their wives; abhor polygamy, and have a proverb that "Death alone can separate husband and wife." In this they are very unlike their more civilized neighbours*. An intelligent Kandyan chief, with whom Mr. Bailey visited these Veddahs, was "perfectly scandalized at the utter barbarism of living with only one wife, and never parting until separated by death." It was, he said, "just like the wanderoos" (monkeys). Even in their marriage relations, however, the Veddahs cannot altogether be commended, as it is —or was until lately—very usual with them for a man to marry his younger sister. This is the more remarkable, as marriage with an elder sister seemed to them as horrible as it does to us.

The Andaman Islanders.

The Mincopies, or inhabitants of the Andaman Islands, have been described by Dr. Mouatt†, Sir E. Belcher‡, and Prof. Owen||, who considers that they "are, perhaps, the most primitive, or lowest in the scale of civilization, of the human race." Their huts consist of four posts, the two front ones six to eight feet high, the back ones only one or two feet. They are open at the sides, and covered with a roof of bamboo, or a few palm-leaves bound tightly together. The Mincopies live chiefly on fruit, mangroves, and shell-fish. Sometimes, however, they kill the small pigs, which run wild in the jungle.

They have single-tree canoes, hollowed out with a *p*-shaped

* It is only fair to add that the Kandyans are said to have much improved in this respect of late years.

† Adventures and Researches among the Andaman Islanders.

‡ Belcher, Trans. Ethn. Soc. New Ser. vol. v. p. 40.

|| Transactions of the Ethnological Society. New Ser. vol. ii. p. 34.

axe, assisted probably by the action of fire. They are acquainted with the use of outriggers, which, however, appear to have been of recent introduction, as they are not alluded to by the earlier writers*. Their arrows and spears are now generally tipped with iron and glass, which they obtain from wrecks, and which have replaced bone. Their harpoons, like those of so many other savages, have a movable head, and a long cord by which this may be held when fixed in the victim†. They are very skilful with the bow, and "make practice at forty or fifty yards with unerring certainty‡," though their arrows have no feathers. Their nets are made with great ingenuity and neatness. They have no pottery, but use either shells or pieces of bamboo to hold water. They kill fish by harpoons, or with small hand-nets they take any that are left by the tide, and it is even said that they are able to dive and catch them with their hands§.

They cover themselves with mud, and also tattoo, but wear no clothes. Indeed they appear to be entirely without any sense of shame, and many of their habits are like those of beasts. They are stated to have no idea of a Supreme Being, no religion, nor any belief in a future state of existence. After death, the corpse is buried in a sitting posture. When it is supposed to be entirely decayed, the skeleton is dug up, and each of the relations appropriates a bone. In the case of a married man, the widow takes the skull and wears it suspended by a cord round her neck‖. It forms a very convenient box for small articles. Marriage, however, only lasts until the child is born and weaned, when, according to Lieut. St. John, as quoted by Sir E. Belcher, the man and woman generally separate, each seeking a new partner¶.

* Mouatt, l. c. p. 317.
† Mouatt, l. c. p. 326.
‡ Belcher, Trans. Ethn. Soc. New Ser. vol. v. p. 49.
§ Mouatt, l. c. pp. 310, 333.
‖ Mouatt, l. c. p. 327. Belcher, l. c. p. 43.
¶ l. c. p. 45.

They have no dogs, nor any domestic animals, unless, indeed, their poultry may be regarded as such.

The Australians.

Throughout the whole continent of Australia the aborigines were remarkably similar in physical appearance, in character, and in general habits. They were, in some respects, scarcely, if at all, farther advanced than those of the Andaman Islands. The "houses" observed by Captain Cook "at Botany Bay, where they were best, were just high enough for a man to sit upright in; but not large enough for him to extend himself in his whole length in any direction; they were built with pliable rods about as thick as a man's finger, in the form of an oven, by sticking the two ends into the ground, and then covering them with palm leaves and broad pieces of bark; the door is nothing but a large hole at one end." Eyre also gives a very similar description of those observed by him*. Further north, where the climate was warmer, the dwellings were even less substantial, and being comparatively open on one side, scarcely deserve even the name of huts, and were little more than a protection against the wind. Finally, the natives observed by Dampier near C. Levéque, on the north-west coast, seem to have had no houses at all. Round their dwelling-places Captain Cook observed "vast heaps of shells, the fish of which we suppose had been their food†." Captain Grey also describes similar shell mounds‡, some of which covered quite half an acre, and were as much as ten feet high. They seem, however, to have been first noticed by Dampier§.

* Discoveries in Central Australia, vol. ii. p. 300.

† First Voyage, vol. iii. p. 598.

‡ l. c. vol. i. p. 110. See also King's Australia, vol. i. p. 87.

§ Pinkerton's Voyages, vol. ii. p. 473.

The food of the Australian savages differs much in different parts of the continent. Speaking generally, it may be said to consist of various roots, fruits, fungi, shell-fish, frogs, snakes, honey, grubs, moths, birds, birds' eggs, fish, turtles, dog, kangaroo, and sometimes of seal and whale*. The kangaroo, however, forms only an occasional luxury, nor are the natives, so far as I am aware, able to kill whales for themselves, but when one is washed on shore it is a real godsend to them. Fires are immediately lit to give notice of the joyful event. Then they rub themselves all over with blubber, and anoint their favourite wives in the same way; after which they cut down through the blubber to the beef, which they sometimes eat raw and sometimes broil on pointed sticks. As other natives arrive they "fairly eat their way into the whale, and you see them climbing in and about the stinking carcase, choosing titbits." For days "they remain by the carcase, rubbed from head to foot with stinking blubber, gorged to repletion with putrid meat—out of temper from indigestion, and therefore engaged in constant frays—suffering from a cutaneous disorder by high feeding—and altogether a disgusting spectacle. There is no sight in the world," Captain Grey adds, "more revolting than to see a young and gracefully-formed native girl stepping out of the carcase of a putrid whale." The Australians also mash up bones and suck out the fat contained in them. Like other savages, they are excessively fond of fatty substances.

In a cave on the north-eastern coast, Mr. Cunningham observed certain "tolerable figures of sharks, porpoises, turtles, lizards, trepang, starfish, clubs, canoes, water-gourds, and some quadrupeds which were probably intended to represent kangaroos and dogs." The natives round Sydney

* Grey's Explorations in North-West and Western Australia, p. 263; Eyre, vol. ii. p. 251; McGillivray's Voyage of H.M.S. Rattlesnake, vol. i. p. 148.

also frequently drew upon the rocks "various figures of fish, clubs, swords, animals, and branches of trees, not contemptibly represented*." Other tribes are very deficient in art, and according to Mr. Oldfield are "quite unable to realize the most vivid artistic representations. On being shown a large coloured engraving of an aboriginal New Hollander, one declared it to be a ship, another a kangaroo, and so on; not one of a dozen identifying the portrait as having any connexion with himself†." It is not, however, quite clear to me that they were not poking fun at Mr. Oldfield.

On the north-eastern coasts they use canoes made from the trunks of trees, each canoe being formed from a single trunk, probably hollowed by fire. "They are about fourteen feet long, and being very narrow, are fitted with an outrigger‡." Farther south the canoes were nothing but a piece of bark, tied together at the ends and kept open in the middle by small bows of wood. The western tribes had no canoes§, owing, according to King||, to the absence of large timber¶. Instead of a boat they used a log of wood, on which they sat astride, with a bit of bark in each hand, which served as a paddle. Some tribes fasten four or five mangrove stems together so as to make a small float or raft. The natives observed by Dampier were even worse off in this respect; they had "no boats, canoes, or bark logs." Yet they dwelt on the shore, lived principally on fish, and swam about from island to island. The Western Australians, according to Jukes, had neither boats nor rafts, "and the islands close

* King, vol. ii. p. 26; Grey, vol. i. p. 259; Collins, p. 381.

† Oldfield on the Aborigines of Australia. Transactions of the Ethnological Society. New Ser. vol. iii.

‡ Freycinet, Voyage autour du Monde, vol. ii. p. 705; Jukes, Voyage of H.M.S. Fly, ii. 243.

§ Cook's First Voyage, vol. iii. p. 643.

|| l. c. vol. i. pp. 38. 43. 49; vol. ii. pp. 66. 69.

¶ In his view, however, of Careening Bay, the country appears to be well wooded.

to the mainland had never been visited by them previously to the founding of our colonies." So also the natives near Sydney are said to have been unable to swim*. The absence of canoes is very remarkable in a people whose habits were so littoral, and whose food was derived almost entirely from the sea.

The implements of the Australians are very simple. They have no knowledge of pottery, and carry water in skins or in vessels made of bark. They are quite ignorant of warm water, which strikes them with great amazement†. Some of them carry "a small bag, about the size of a moderate cabbage-net, which is made by laying threads loop within loop, somewhat in the manner of knitting used by our ladies to make purses. This bag the man carries loose upon his back by a small string, which passes over his head; it generally contains a lump or two of paint and resin, some fish-hooks and lines, a shell or two, out of which their hooks are made, a few points of darts, and their usual ornaments, which includes the whole worldly treasure of the richest man among them."

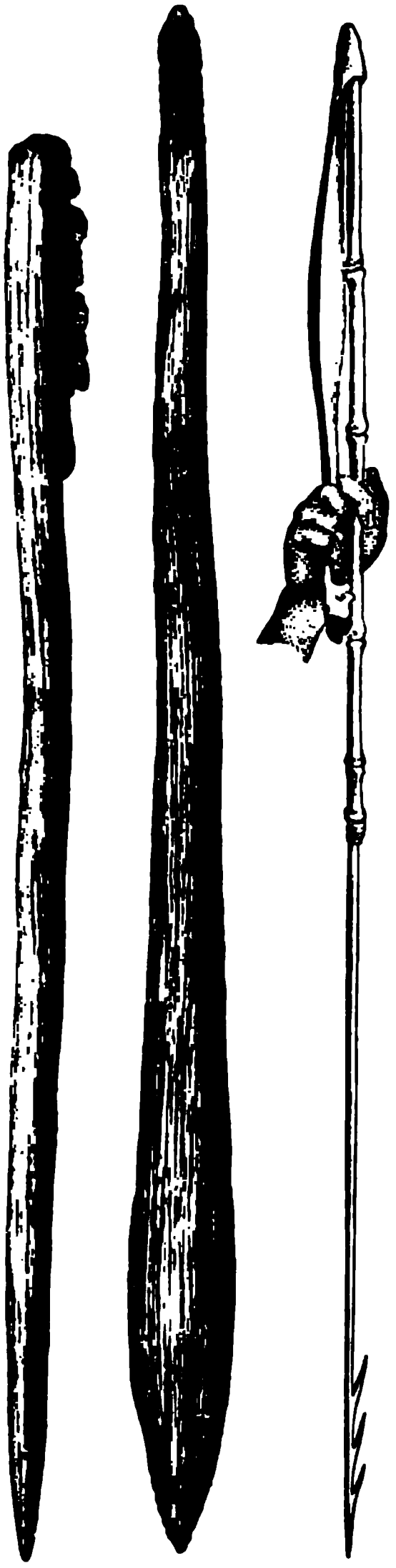
A very similar inventory is given by Capt. Grey, who adds, however, a flat stone to pound roots with‡. They have also stone hatchets, hammers, knives, pieces of flint, and sticks to dig up roots. The hammer is used for killing seals or other animals, and for breaking open shell-fish. The handle is from twelve to fifteen inches long, pointed at one end, and having on each side at the other a hard stone attached to the handle by a mass of gum. The knives (fig. 205, which represents a specimen presented to me by A. W. Franks, Esq.) have a similar handle, and at the end a few splinters of quartz or flint, arranged in a row and fastened into a slit with gum in the same manner.

* Voyage of the Novara. English Trans. vol. iii. p. 36.

† D'Urville, vol. i. p. 461.

‡ l. c. p. 266.

Fig. 205. Fig. 206. Fig. 207.



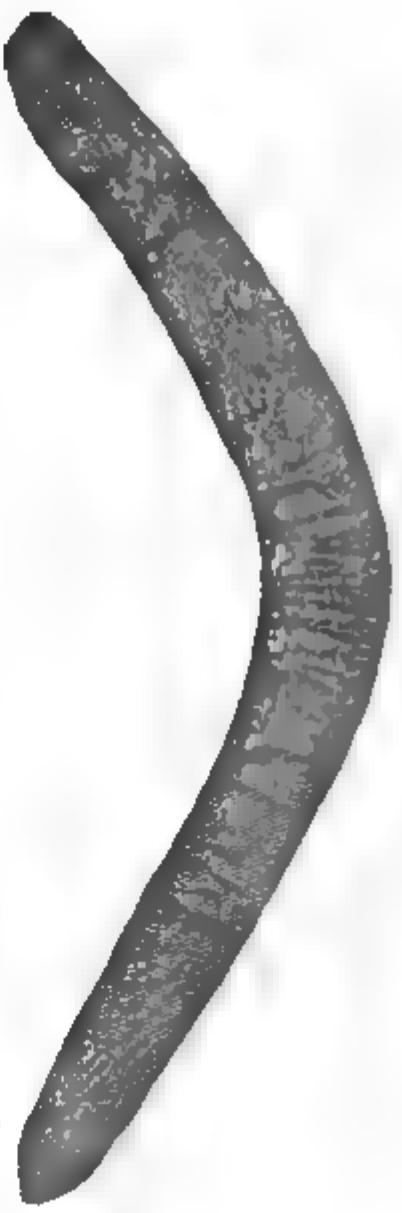
Australian Knife. Australian Club. Australian Spear-caster.

The natives of Botany Bay had fish-hooks, but no nets; on the contrary, Capt. Grey, in describing those of Western Australia, mentions nets, but not hooks; Eyre also states that hooks were unknown in South Australia, while nets were used in hunting and as bags; lastly, the natives of the north-west, according to Dampier, had "no instruments to catch great fish." Those seen by King were also without hooks or nets*. Throughout the continent they were ignorant both of slings and bows and arrows. On the other hand they had spears, clubs (fig. 206), shields, and two very peculiar instruments, namely, the throwing-stick (fig. 207), and the boomerang (fig. 208). The spear, however, is their national weapon. These are about ten feet long, and very slender, made of cane or wood, tapering to a point, which is barbed. They are light, and one would scarcely be inclined to believe that they could be darted with any force: this, however, is effected by the aid of the wummera, a straight flat stick, three feet in length, terminating in a socket of bone or hide, into which the end of the spear is fixed. The wummera is grasped in the right

* l. c. vol. ii. p. 137.

hand by three fingers (fig. 207), the spear lying between the fore-finger and thumb. Previous to throwing it, a tremulous or vibratory motion is given to it, which is supposed to add to the accuracy of the aim: in projecting the spear, the wummera is retained in the hand, and the use of this simple contrivance adds greatly to the projectile force given to the spear. They are well practised in the use of these weapons*. Indeed, Capt. Grey tells us that he has often seen them kill a pigeon with a spear at a distance of thirty yards, and Captain Cook says that "at a distance of fifty yards these Indians were more sure of their mark than we could be with a single bullet†." The very long Australian spears are not thrown with the wummera, but by the strength of the arm alone. They are of several kinds; those used for striking turtle or dugong, have a movable, barbed blade, which is attached by a string to the butt-end of the spear; when the turtle is struck, the shaft becomes detached from the point, which remains fixed in the body, while the shaft serves partly to impede the motions, and partly as a float to indicate the position of the turtle‡." A similar weapon is used by the Esquimaux, the Mincopies, the Fuegians, the Brazilian Indians, and other savages. But the most extraordinary wea-

Fig. 206.



Boomerang.

* United States Explor. Exped. vol. i. p. 191.

† Cook, l. c. 642.

‡ Hawkesworth's Voyages, vol. iii. p. 636. See also Eyre, vol. ii. p. 305. McGillivray, vol. i. p. 147.

pon, and one quite peculiar to Australia, is the boomerang. This is a curved stick, generally rounded on one side, flatter on the other, about three feet long and two inches wide, by three-quarters of an inch thick. At first sight it looks something like a very rude wooden sword. It was used both in the chase and in war. "It is grasped at one end in the right hand, and is thrown sickle-wise, either upwards into the air, or downwards so as to strike the ground at some distance from the thrower. In the first case it flies with a rotatory motion, as its shape would indicate; after ascending to a great height in the air, it suddenly returns in an elliptical orbit to a spot near its starting-point. On throwing it downwards on the ground, it rebounds in a straight line, pursuing a ricochet motion until it strikes the object at which it is thrown. Birds and small animals are killed with it, and it is also used in killing ducks. The most singular curve described by it is when thrown into the air, above the angle of 45°; its flight is always then backwards, and the native who throws it stands with his back, instead of his face, to the object he is desirous of hitting*." Mr. Merry, a gentleman who resided for some time in Australia, informs me that on one occasion, in order to test the skill with which the boomerang could be thrown, he offered a reward of sixpence for every time the boomerang was made to return to the spot from which it was thrown. He drew a circle of five or six feet on the sand, and although the boomerang was thrown with much force, the native succeeded in making it fall within the circle five times out of twelve. Eyre also says that this weapon is particularly useful in war, "as it is almost impossible, even when it is seen in the air, to tell which way it will go, or where descend. I once nearly had my arm broken by a wangno, whilst standing within a yard of the native who threw it, and looking out purposely for

* United States Explor. Exped. l. c.

it*." Mr. Oldfield†, on the contrary, speaks much less favourably of the boomerang. It is, he says, but little used in war, nor do the natives "ever attempt to kill a solitary bird or beast by means of" it. On the other hand, in swampy localities, where waterfowl "congregate largely, the boomerang is of essential use; for a great number of them being simultaneously hurled into a large flock of waterfowl, ensures the capture of considerable numbers."

The Australians obtain fire by rubbing together two pieces of wood. The process, however, being one of considerable labour, particularly in damp weather, great care is taken to prevent the fire, when once lighted, from becoming extinguished. For this reason they often carry with them a cone of banksia, which burns slowly like amadou ‡.

Mr. Stuart informs me that some of the northern tribes had no means of relighting their fires, but if they ever became simultaneously extinguished, used to go to a neighbouring tribe for a fresh light. So also, according to M. Angas, some of the western tribes "have no means of kindling fire. They say that it formerly came down from the north," and if it happens to go out they procure it again from some neighbouring encampment §.

According to Captain Cook, the Australians had "no idea of traffic, nor," he says, "could we communicate any to them: they received the things which we gave them, but never appeared to understand our signs when we required a return. The same indifference which prevented them from buying what we had, prevented them also from attempting to steal: if they had coveted more, they would have been less honest ||." In other parts, however, they are more ad-

* l. c. vol. ii. p. 308.

† Trans. Ethn. Soc. N. S. vol. iii. p. 264.

‡ D'Urville, vol. i. p. 194.

§ Savage Life and Scenes, vol. i. p. 112.

|| l. c. p. 635.

vanced in this respect. Various kinds of pigments, feathers, shells, implements, and especially flints, are the principal articles of barter.

The Australians observed by Cook, Dampier, and Flinders were entirely destitute of clothing, and their principal ornament consisted of a bone, five or six inches long, and half an inch thick, thrust through the cartilage of the nose. They did not tattoo. On the north-west coast, King observed some of the natives with a very peculiar decoration. At every three inches between the upper part of the chest and the navel, the body was scarified in horizontal bands, the cicatrices of which were at least an inch in diameter, and raised half an inch from the body*. Some of them fastened to their hair, by means of gum, teeth of kangaroos or of men, dogs' tails, fish-bones, bits of wood, and other objects which they regarded as ornamental. Frequently they wore pieces of opossum, or kangaroo-skin—not for decency, however, but for warmth, and while hunting, as a protection from thorns. According to D'Urville, however, the natives of New South Wales did not think it decent that young children should go quite naked†. McGillivray also mentions a very similar idea at Moreton Bay. In many parts of Australia the natives also paint themselves, red and white being the favourite, or at least the commonest colours. The red is laid on in broad patches, the white generally in stripes or spots, a circle often being drawn round each eye. Some tribes, but not all, tattoo themselves on the back and breast in rows, rings, and semicircles. Among the females on the Murray, the only ceremony of importance with which Eyre was acquainted was that of scarring the back. Eyre indeed calls it tattooing, but "crimping" would, I think, be a more correct expression. It takes place at the age of puberty, and is extremely painful. The young woman kneels down and

* l. c. p. 42.

† Voyage de l'Astralabe, vol. i. p. 471.

places her head between the knees of a strong old woman, and the operator, who is always a man, cuts the back with a piece of shell or flint in rows of long, deep gashes from left to right quite across the back, and completely up to the shoulders. The whole scene is most revolting, the blood gushes out in torrents, and saturates the ground, while the cries of the poor victim gradually rise into screams of agony. Still the girls submit voluntarily, as a well-carved back is much admired. The lads also generally have to undergo a ceremony of initiation before they are permitted to rank as men. This sometimes consists in circumcision *, sometimes in another almost incredible ceremonial †, or frequently in punching out one of the front teeth. Other tribes have peculiar and distinctive incisions, such as scars running across the chest, circles on the shoulders, or various combinations of small dots.

In the Adelaide district, according to Mr. Moorhouse, there are five distinct stages of initiation, before the native is admitted to all the privileges of a man. Yet the Australians cannot be said to have any form of government, nor have any distinctions of rank, or recognized chiefs, ever been found amongst them.

The children have a game with string something like our cat's-cradle, but their principal amusements consist in learning to hunt, fish, etc. The elder people are fond of dances, which may be divided into war-dances, hunting-dances, and love-dances,—the two latter being most common. These generally take place when tribes meet, and are held at night. Their songs are rude, with simple and generally extempore words.

They have no systematized religion, nor any worship or prayer; but most of them believe in evil spirits, and all have a great dread of the dark, and of witchcraft. In fact, they believe that no one ever dies a natural death.

* Eyre, vol. ii. p. 332. † Funditur usque ad urethram à parte inferâ penis.

Captain Wilkes * describes an Australian funeral as follows. Almost immediately after death the corpse was arranged in a sitting posture, the knees bent up close to the body, the head pressed forwards, and the whole body closely tied up in a blanket. An oval grave was then dug, about six feet long, three wide, and five deep. At the bottom was a bed of leaves, covered with an opossum-skin cloak, and with a stuffed bag of kangaroo-skin for a pillow; on this the body was laid with its implements and weapons. Above the corpse were strewn leaves and branches, and the hole was then filled up with stones. Finally, the earth which had been removed was put over the whole, making a mound eight or nine feet high. According to D'Urville the natives of New South Wales bury the young, and burn the old†. Other tribes dispose of their dead in other ways; but none of them were addicted to cannibalism as a matter of habit or choice, although they were not unfrequently driven to it by the scarcity of other food.

No single fact, perhaps, gives us a more vivid idea of the mental condition of these miserable savages, than the observation that they cannot count their own fingers—not even those of one hand. Mr. Crawfurd ‡ has examined the numerals of thirty Australian languages, "and in no instance do they appear to go beyond the number four." Mr. Scott Nind, indeed, has given an account of the Australians of King George's Sound, to which a vocabulary is annexed, containing the numerals, which are made to reach the number five. The term for this last unit, however, turns out to be only the word "many. In fact, the word "five" conveys to them the idea of a great number, as a "hundred" or a "thousand" does to us.

Their language, moreover, contains "no generic terms as

* l. c. vol. ii. p. 195. Fitzroy, l. c. vol. ii. p. 628. † Vol. i. p. 472.
‡ Transactions of Ethn. Soc. New Series, vol. ii. p. 84.

tree, fish, bird, etc., but only specific ones, as applied to each particular variety *."

Polygamy is permitted; but a man who takes more than two wives is generally looked upon as a selfish and unreasonable person, nor is any man allowed to marry a woman of his own name. If a married man dies, his brother inherits the wife, who "goes to her second husband's hut three days after the death of her first."

Though they are apparently fond of their children, even Eyre admits that there is little affection between husband and wife. "After a long absence," he says, "I have seen natives upon their return, go to their camp, exhibiting the most stoical indifference, never take the least notice of their wives, but sit down, and act and look as if they had never been out of the encampment †." Women, in fact, are regarded as mere property. There is no ceremony of marriage, and chastity is entirely disregarded, wives being valued principally for their services as slaves, and terribly ill-treated. "No one," says Eyre, "ever attempts to take the part of a female‡." Beauty only makes matters worse. "The early life," says Captain Grey, "of a young woman at all celebrated for beauty is generally one continued series of captivity to different masters, of ghastly wounds, rapid flights, and bad treatment from other females§," jealous of her superior attractions. Few women in Australia, it is said, live to thirty. Yet with all this lawlessness, and tyranny, marriage is regulated by certain very curious prohibitions. Thus a man may steal another man's wife if he can, but, as already mentioned, he may not under any circumstances marry a woman of the same family name, even though not related in the remotest degree. There are certain great families, such as the Ballaroke, Tdondarup, Ngotak, Nagarnook, Nogonyuk, Mongalmy, and

* Eyre, vol. ii. p. 392.
† l. c. pp. 2. 215. See also 320.
‡ l. c. vol. ii. p. 387.
§ l. c. vol. ii. p. 249.

Narrangur, which occur over a great portion of the Continent, and within which marriage is not permitted *. There are many other cases of prohibitions; "indeed," says Mr. Lang †, "instead of enjoying perfect personal freedom, as it would at first appear, they are governed by a code of rules and a set of customs which form one of the most cruel tyrannies that has ever, perhaps, existed on the face of the earth, subjecting not only the will, but the property and life of the weak to the dominion of the strong. The whole tendency of the system is to give every thing to the strong and old, to the prejudice of the weak and young, and more particularly to the detriment of the women. They have rules by which the best food, the best pieces, the best animals, etc., are prohibited to the women and young men, and reserved for the old. The women are generally appropriated to the old and powerful, some of whom possess from four to seven wives; while wives are altogether denied to young men, unless they have sisters to give in exchange, and are strong and courageous enough to prevent their sisters from being taken without exchange."

The Tasmanians.

The inhabitants of Van Dieman's Land belonged to quite a different race, but were just as wretched as those of Australia. According to Captain Cook's account they had no houses, no clothes, no canoes, no instrument to catch large fish, no nets, no hooks; they lived on mussels, cockles, and periwinkles, and their only weapon was a straight pole, sharpened at one end ‡. Mr. Dove informs us that they are entirely without any "moral views and impressions." Indeed, he scarcely appears to regard them as rational beings §.

* Eyre, vol. ii. p. 329.

† The Aborigines of Australia. G. S. Lang, p. 7.

‡ Third Voyage, vol. i. p. 100.

§ Tasmanian Jour. of Nat. Sci. vol. i. p. 249.

Like the Australians, they have no means of expressing abstract ideas; they have not even a word for a "tree." Although fire was well known to them, some tribes, at least, appear to have been ignorant whence it was originally obtained, or how, if extinguished, it could be re-lighted. "In all their wanderings," says Mr. Dove, "they were particularly careful to bear in their hands the materials for kindling a fire. Their memory supplies them with no instances of a period in which they were obliged to draw on their inventive powers for the means of resuscitating an element so essential to their health and comfort as flame. How it came originally into their possession is unknown. Whether it may be viewed as a gift of nature, or the product of art

Fig. 209.

Tasmanian Firesticks.

and sagacity, they cannot recollect a period when it was a desideratum. . . . It was the part of the females especially to carry a firebrand in their hands, which was studiously refreshed from time to time as it became dull and evanescent*." Fig. 209 represents a pair of Tasmanian firesticks, presented to me by Mr. Robinson.

Feegee Islanders.

The islands of the Pacific contain two very distinct races of men—the Negrito and the Polynesian. My space does not permit me to enter into the interesting question of their relationships and affinities.

* Tasmanian Journal of Nat. Sci. vol. i. p. 250.

The Feegeeans belong to the former category, and in many respects resemble negroes. They are darker than the Polynesians. The jaws are larger, and the hair, though not exactly woolly, is frizzled. They are a powerful race, but not so graceful as the Polynesians. Their language is, however, more Polynesian than Negrito. Their institutions, customs, and manners, were partly Polynesian, partly Negrito*. It is remarkable that they did not use the consonants "b," "d," or "g," without placing "m" or "n" before them, as for instance Mbau, Nduandua, Ngata. It is well known how frequent these sounds are in Negro names.

The food of the Feegee Islanders consisted of fish, turtle, shell-fish, crabs, human flesh whenever it could be obtained, taro, yams, mandrai, bananas, and cocoa-nuts, in addition to which the higher classes occasionally indulged in pigs and fowls. They drank *ava* habitually, and at all their ceremonies.

Their weapons consisted of spears, slings, clubs, bows and arrows. The spears were from ten to fifteen feet long, and were generally made of cocoa-nut wood; the end was pointed and charred; sometimes, though not often, a sharp bone was used for the point. They had several kinds of clubs, all made of iron wood. That most esteemed was about three feet long with a heavy knob at the end. Another kind was somewhat shovel-shaped, and might rather be called a short sword. The *ula* was a short heavy club, about eighteen inches long, with a large and heavy knob. It was used as a missile, and the natives threw it with great accuracy and force. These were their principal weapons, the bows and arrows being weak and light. They were, however, used in war, as well as in killing fish. The fortified towns of the Feegeeans had an earthen "rampart, about six feet thick, faced with large stones, surmounted by a reed

* Latham. Varieties of Man, p. 226.

fence of cocoa-nut trunks, and surrounded by a muddy moat*."

Their houses were oblong, from twenty to thirty feet long, and fifteen feet high. They were made of cocoa-nut wood and tree fern, and were sometimes very well built. They had two doorways on opposite sides, from three to four feet high and four feet wide. The sides were made of posts about three feet apart, and filled in with wickerwork. The roof had a steep pitch; the rafters were generally of palm wood, thatched with wild sugar cane, under which they placed fern leaves. A mat served as a door, and a few flat stones near the middle of the house served as the fireplace. The houses were seldom divided by partitions, but the two ends were raised about a foot, and were covered with layers of mats on which the natives slept.

Their temples were pyramidal in form and were often erected on terraced mounds, like those of Central America†. They also venerated certain upright stones‡, resembling those which we call Druidical. "The Feegeeans," says Mr. Hazlewood, "consider the gods as beings of like passions with themselves. They love and hate; they are proud and revengeful, and make war, and kill and eat each other; and are, in fact, savages and canibals like themselves." "Cruelty," says Captain Erskine§, "a craving for blood, and especially for human flesh as food, are characteristic of the gods." Yet the Feegeeans looked upon the Samoans with horror, regarding them as having no religion, because they had no belief in any such deities, nor any of the sanguinary rites which prevailed in other islands.

The Feegee canoes were very well constructed. They

* Williams, Figi and the Figians, vol. i. p. 48.

† B. Seemann, in the Vacation Tourist for 1861, p. 269.

‡ Figi and the Figians, vol. i. p. 220.

§ Journal of a Cruise in the Western Pacific, p. 247.

were generally double, of unequal size, the smaller one serving as an outrigger. The larger ones were sometimes more than a hundred feet in length. The two canoes were connected by a platform, generally about fifteen feet wide and projecting two or three feet beyond the sides. The bottom of each consisted of a single plank; the sides were fitted by dovetailing, and closely united by lashings passed through flanges left on each of the pieces. The joints were closed by the gum of the bread-fruit tree. The sails were large and made of mats. The mast was generally about half the length of the canoe, and the yard and boom usually twice as long as the mast. Their principal tool was an adze, formerly of stone, but now generally of iron. For boring holes they used the long spines of the echina, pointed bones, and, when they could get them, nails. Small teeth, such as those of rats and mice, were used for carving; and their knives were made of the outside of a piece of bamboo, shaped into form while green. After being dried it was charred, and thus became very hard and sharp, so that it might even be used in surgical operations. They differed from the Polynesians in using earthenware pots for cooking. These were graceful and well made, though the potter's wheel was unknown. The pottery was all made by women. Their tools were very simple, consisting of a small round flat stone to fashion the inside, and a flat mallet or spatula for the surface, which they made almost as round as if it had been turned in a lathe. Forks appear to have been long in use among the Feegeeans; a remarkable fact, if we remember that they were unknown in Northern Europe until the seventeenth century.

The Feegeeans have several kinds of games. They are fond of swinging, and of throwing stones or fruits at a mark. They have also a game resembling skittles. Their dances, like those of so many other nations, are any thing but

decorous. Their musical instruments are the conch-shell, the nose-flute, pipes, a Jew's-harp made of a strip of bamboo, and several sorts of drums. They are also fond of poetry.

Their agricultural implements have been described by Mr. Williams. The digging-sticks are made of a young mangrove-tree. They are about the size of an ordinary hay-fork, and the lower end "is tapered off on one side, after the shape of a quill toothpick. In digging, this flattened side is kept downwards. When preparing a piece of ground for yams, a number of men are employed, divided into groups of three or four. Each man being furnished with a digging-stick, they drive them into the ground so as to enclose a circle of about two feet in diameter. When, by repeated strokes, the sticks reach the depth of eighteen inches, they are used as levers, and the mass of soil between them is thus loosened and raised*." The clods are then broken up by boys with short sticks. Weeding "is accomplished by means of a tool used like a Dutch hoe, the workmen squatting so as to bring the handle nearly level with the ground. The blade used formerly to be made of a bone from the back of a turtle, or a plate of tortoise-shell, or the valve of a large oyster, or large kind of pinna. In the Windward Islands they use a large dibble, eight feet long, about eighteen inches in circumference, and tapering to a point. They had also pruning knives of" tortoise-shell lashed to the end of a rod ten feet long. They are skilful in basket-making, and have good strong nets made of creepers or of sinnet.

The women are kept in great subjection. "The men frequently tie them up and flog them. Like other property, wives might be sold at pleasure, and the usual price is a musket. Those who purchase them may do with them as they please, even to knocking them on the head." Erskine, however, gives a more satisfactory account of the position

* Figi and the Figians, vol. i. p. 63.

held by the women; and it appears that they are on the whole more chaste than is the case in some of the other Pacific Islands, which is saying something for them, but certainly not much. Although so lax in some things, they were very strict in others, and it was thought improper in some of these islands for husband and wife to spend the night under the same roof.

Although but scantily clothed, the Feegeeans were very particular about their garments and their paint. They were specially proud of their hair, and if it was short they wore a wig as a substitute. Some of these wigs were most elaborate. The men wore "tapa," which is a kind of cloth obtained from the inner bark of the paper-mulberry, and made into a sash, from three to one hundred yards in length. Six or ten yards is, however, the usual quantity, and it is passed between the legs and round the waist*. The women are not permitted to use "tapa," and their dress is more scanty than that of the men, consisting, indeed, only of the "liku," a kind of band, made of the bark of hibiscus, and fastened round the waist. It ends in a fringe, which is worn short by the girls, but longer after marriage. Nevertheless, though almost naked, the Feegeeans are said to have been very modest, and if any one were found entirely without clothes, Captain Wilkes thinks that the offender would be immediately put to death.

Tattooing is confined to the women, who are ornamented in this manner on the fingers, the corners of the mouth, and, oddly enough, on those parts of the body which are covered by the "liku." The process is very painful, but submission to it is regarded as a religious duty†, any neglect of which will assuredly be punished after death‡.

The graves of the common people are only marked by a

* Figi and the Figians, vol. i. p. 156.

† Ibid. p. 160; Wilkes, l. c. p. 355.

‡ A Mission to Viti, p. 112.

few stones, but over those of chiefs they build small houses, from two to six feet high, or in some cases erect large cairns of stone; these also are sometimes "set up to mark the spot where a man has died*." The body is buried in a sitting posture. The usual sign of mourning is to crop the hair or beard, or both. Very often, also, they burn the skin into blisters, and cut off the end-joints of the small toe and little finger.

Among the Feegeeans, parricide is not a crime, but a custom. Parents are generally killed by their children. Sometimes the aged people make up their minds that it is time to die; sometimes it is the children who give notice to their parents that they are a burden to them. In either case, the friends and relatives are summoned, a consultation takes place, and a day is fixed for the ceremony, which commences with a great feast. The missionaries have often witnessed these horrible tragedies. On one occasion, a young man invited Mr. Hunt to attend his mother's funeral, which was just going to take place. Mr. Hunt accepted the invitation, but when the funeral procession started, he was surprised to see no corpse, and accordingly made inquiries, when the young savage "pointed out his mother†, who was walking along with them, as gay and lively as any of them present, and apparently as much pleased. . . . He added that it was from love for his mother that he had done so; that in consequence of the same love, they were now going to bury her, and that none but themselves could or ought to do so sacred an office. . . . . She was their mother, and they were her children, and *they ought* to put her to death." In such cases the grave is dug about four feet deep, the relatives and friends begin their lamentations, take an affectionate parting, and bury the poor victim alive. It is surprising after this to hear that Mr. Hunt regarded the Feegeeans

* Figi and the Figians, vol. i. p. 192.

† Wilkes, l. c. p. 95.

as being kind and affectionate to their parents; but in fact "they consider this custom so great a proof of affection, that none but children could be found to perform it." The fact is that they not only believe in a future state, but are persuaded that as they leave this life so they will rise again*. They have, therefore, a powerful motive for quitting this world before they are weakened by old age; and so general was this belief, so powerful the influence which it had upon them, that in one town, containing several hundred inhatants, Capt. Wilkes did not see one man over forty years of age; and, on asking for the old people, he was informed that they were all buried. Again, during the first year of Mr. Hunt's residence at Somo-somo, there was only one instance of natural death; all the aged and diseased having been strangled or buried alive.

When a chief died it was usual to "send with him" some of his women and some slaves. At the death of Ngavindi, Mr. Calvert went to Mbau, hoping "to prevent the strangling of women, but was too late. Three had been murdered. Thakombau proposed to strangle his sister, the chief wife of the deceased, as was the usual custom; but the Lasakau people begged that she might be spared, and that her child might become their chief. Ngavindi's mother offered herself as a substitute, and was strangled. The dead chief lay in state, with a dead wife by his side, on a raised platform; the corpse of his mother on a bier at his feet, and a murdered servant on a mat in the midst of the house. A large grave was dug in the foundation of a house near by, in which the servant was laid first, and upon her the other three corpses, wrapped and wound up together†." In these cases the wives generally die voluntarily, believing that thus only can they hope to go to heaven. Horrible as are these facts, they

* Figi and the Figians, vol. i. p. 183.

† Ibid. vol. ii. p. 301.

at least show how strong must be the belief felt in a future state of existence.

Still, though we may allow the goodness of the motive to extenuate some of these atrocities, it must be allowed that human life was but little regarded in Feegee. Not only infanticide, but also human sacrifices, were very common, and, in fact, scarcely any thing was undertaken without the latter. When the king launched a canoe, ten or more men were slaughtered on the deck, in order that it might be washed with human blood. But there is even worse to be told. The Feegeeans were most inveterate cannibals, and so fond were they of human flesh, that "the greatest praise they can bestow on any delicacy is to say that it is as tender as a dead man." Nay, they were even so fastidious as to dislike the taste of white men*, to prefer the flesh of women to that of men, and to consider the arm above the elbow, and the thigh as the best joints; and so greedy, that human flesh was reserved for the men, being considered too good to be wasted upon the women. When the king gave a feast human flesh always formed one of the dishes, and though the bodies of enemies slain in battle were always eaten, they did not afford a sufficient supply, but slaves were fattened up for the market. Sometimes they roasted them alive and ate them at once, while at others they kept bodies until they were far gone in decay. Ra Undre-undre, Chief of Rakiraki, was said to have eaten nine hundred persons himself, permitting no one to share them with him†.

It was not from any want of food that the Feegeeans were cannibals. On one occasion they offered to the God of War "ten thousand yams (weighing from six to twelve pounds each), thirty turtles, forty roots of yaquona (some very large), many hundreds of native puddings (two tons), one hundred

* So also did the Australians, the Tongans, and the New Zealanders.

† Figi and the Figians, vol. i. p. 213.

and fifty giant oysters, fifteen water-melons, cocoa-nuts, a large number of violet land-crabs, taro, and ripe bananas*." At a public feast Mr. Williams once saw "two hundred men employed for nearly six hours in collecting and piling cooked food. There were six mounds of yams, taro, vakalolo, pigs, and turtles: these contained about fifty tons of cooked yams and taro, fifteen tons of sweet pudding, seventy turtles, five cartloads of yaquona, and about two hundred tons of uncooked yams. One pudding, at a Lakemba feast, measured twenty-one feet in circumference." Yet so habitual has cannibalism become, that they have no word for a corpse which does not include the idea of something edible. Human flesh is known as "puaka balava," or "long pig†." "On contemplating the character of this extraordinary people," says Erskine‡, "the mind is struck with wonder and awe at the mixture of a complicated and carefully-conducted political system, highly finished manners, and ceremonious politeness, with a ferocity and practice of savage vices which is probably unparalleled in any other part of the world." "Murder," says Mr. Williams, "is not an occasional thing in Figi, but habitual, systematic, and classed among ordinary transactions§." Elsewhere he tells us that no Feegeean ever feels safe with a stranger at his heels‖, and that to be "an acknowledged murderer is the object of the Figian's restless ambition¶." On the island of Vanua Levu, even among the women, there were "few who had not in some way been murderers**." To this they are trained up from infancy. "One of the first

* Figi and the Figians, vol. i. p. 44.

† Erskine, l. c. p. 260. Other mammalia, when introduced into the South Sea Islands, received names indicative of their similarity to this their principal quadruped: thus the horse was called the "man-carrying pig" in Tahiti, the sheep was the "hog with teeth on its forehead" (Forster, l. c. p. 384).

‡ Erskine, l. c. p. 272.

§ Figi and the Figians, vol. i. p. 134.

‖ l. c. p. 133.

¶ l. c. p. 112.

** l. c. p. 180.

lessons taught the infant is to strike its mother." At Somosomo, Mr. Williams saw mothers leading their children "to kick and tread upon the dead bodies of enemies*. No wonder that under these circumstances "a happy and united household is most rare." Indeed it is nearly impossible, for by an arrangement, which seems almost incredible, "brothers and sisters, first cousins, fathers and sons-in-law, mothers and daughters-in-law, and brothers and sisters-in-law, are severally forbidden to speak to each other, or to eat from the same dish†." Yet amid so much that is horrible, there is still something in the Feegeean which redeems his character from utter atrocity. If he hates deeply, he also loves truly; if his revenge never dies, his fidelity and loyalty are strong and enduring. Thakombau was a thorough Feegeean. Almost to the last he opposed the missionaries. He was not only heathen, but anti-Christian. At length being converted, he called his people together, and, says Mr. Calvert, "What a congregation he had!—husbands whose wives he had dishonoured! widows whose husbands he had slain! sisters whose relatives had been strangled by his orders! relatives whose friends he had eaten! and children, the descendants of those he had murdered, and who had vowed to avenge the wrongs inflicted on their fathers‡!" Yet even this man—an adulterer, a parricide, and a cannibal, whose hands were stained with a hundred murders—had still something noble and lovable about him; so much so indeed that, in spite of his crimes, he secured the affection, the friendship, even the respect, of a man so excellent as Mr. Calvert.

The Maories.

The New Zealanders are the southernmost representatives

* l. c. p. 177.
† l. c. p. 136.
‡ Figi and the Figians, l. c. vol. ii. p. 357.

of the great Polynesian family. Their principal food consisted of fern roots, which they scorched over the fire, and then beat with a stick, till the bark and dry outside fell off; the remainder being a soft substance, rather clammy and sweet, not unpleasant to the taste, but mixed with numerous stringy fibres which are very disagreeable*. In the northern districts were large plantations of yams and sweet potatoes. They also cultivated gourds, which were used for vessels, as they had no pottery. Their only instrument for tillage was "a long narrow stake sharpened to an edge at one end, with a short piece fastened transversely at a little distance above it, for the convenience of pressing it down with the foot." Their animal food consisted principally of fish and shell-fish, and Captain Cook observed large shell-mounds near their houses. They sometimes, also, though rarely, killed rails, penguins, shags, and other birds. They obtain fire from two pieces of wood, in the usual manner†. A New Zealand stone adze is represented in figs. 111–113, p. 99.

The only quadrupeds in the islands were dogs and rats. They had no hogs, and the dogs were kept entirely for food. They were skilful in fishing, having excellent lines, hooks made of bone and shell, and very large nets, which were made of the leaves of a kind of flax, split into strips of the proper breadth and tied together. In making the lines the leaves are "scraped by a shell, which removes the upper or green part, and leaves the strong white fibres, that run longitudinally along the under side‡." This kind of cordage has even been preferred to that made of European hemp.

Of these leaves also they made most of their clothes, for though acquainted with the manufacture of bark-cloth, it

* Dieffenbach's New Zealand, vol. ii. p. 11.

† D'Urville, vol. ii. p. 479.

‡ Fitzroy's Voyage of the "Adventure" and "Beagle," vol. ii. p. 599.

was very scarce, and worn only as an ornament. The leaves were split into three or four slips, which were interwoven into a kind of stuff, something between netting and cloth. Dog's wool was also used for the same purpose*. The dress was alike in both sexes, and consisted of two parts; one piece of their rude cloth (if so it may be called) was tied over the shoulders and reached to the knees, being fastened in front by a piece of string or a bone bodkin; the other piece was wrapped round the waist, and reached nearly to the ground. This garment, however, was worn by the men only on particular occasions.

For ornament they wore combs of wood or bone, feathers, necklaces, bracelets, and anklets of bones and shells, and ear-rings of jade or albatross-down. Many of them had also small grotesque figures of jade, which were suspended from the neck and were regarded as very precious. The New Zealanders were also tattooed with great dexterity and elegance; not only on the body, but even on the face, the general effect of which was in many cases far from unpleasant. The process, however, was extremely painful, so much so, indeed, that it could not be supported all at once, but was sometimes spread over several months, or even years. The lips and the corners of the eyes were the part that hurt most. To have shrunk from it would, however, have been a great disgrace.

Their houses were about eighteen or twenty feet long, eight or ten broad, and five or six high. The sides sloped quite down to the ground, differing in this respect from those of Tahiti, which are left open at the sides. This was done, however, not for the sake of privacy, but to keep out the wind and rain. The sides were made of sticks, closely thatched with grass and hay, and the door was at one end, just high enough to admit a man on all fours. Another hole served both for window and chimney. The roof was often

* D'Urville, vol. ii. p. 500.

carved, and they frequently attached to the end of the ridge pole a monstrous representation of the proprietor*.

Their villages were all fortified. They chose the strongest natural situations, and surrounded the houses with a palisade about ten feet high. The weaker sides were also defended "by a double ditch, the innermost of which has a bank, and an additional palisade." The stakes were driven obliquely into the ground, so that they projected over the ditch, which "from the bottom to the top or crown of the bank is four-and-twenty feet. Close within the innermost palisade is a stage, twenty feet high, forty feet long, and six broad; it is supported by strong posts, and is intended as a station for those who defend the place, from which they may annoy the assailants by darts and stones, heaps of which lay ready for use. Another stage of the same kind commands the steep avenue from the back, and stands also within the palisade†." Within the palisades they had reduced the ground "not to one level, but to several, rising in stages one above the other, like an amphitheatre, each of which is enclosed within its separate palisade." These different platforms communicated only by narrow passages, so that each one was capable of separate defence; and they were provided with large stores of dried fish, fern-roots, etc. As the natives, when first discovered, had no bows and arrows, nor even slings, in fact no "missile weapon except the lance, which was thrown by hand," such positions as these must have been almost impregnable. Their principal weapon was the patoo patoo (fig. 210) which was fastened to the wrist by a

FIG. 210.

Patoo Patoo.

* Dieffenbach, l. c. p. 69. † Cook's First Voyage, p. 343.

strong strap, lest it should be wrenched from them. They had no defensive armour, but besides their weapons the chiefs carried a "staff of distinction."

Their canoes were well built, and resemble those of the other islands. Many of them, however, were broad enough to sail without an outrigger. The two ends were often ingeniously carved*.

The dead were wrapped in native cloth, and either buried in a contracted posture, or exposed for a while on small square platforms; when the flesh had decayed away, the bones were washed, and finally deposited in a small covered box, which was generally elevated on a column in or near the village†. In some districts, however, they were usually thrown into the sea, except indeed those that were killed in battle. These were gencrally eaten by their enemies. None of the objects used by the dead during his last illness were ever employed again‡; they were generally broken or buried with the deceased. In one case a moa's egg has been found in the hands of a dead Maori, who was buried in the usual sitting posture. The egg was perfect§, and may have been intended to serve as food for the dead.

In the Taranaki district, according to Taylor, the natives were buried in their houses, the door was tied up and painted with ochre to show that it was "taboo." In most of the Pahs or fortified villages half the houses belonged to the dead, and these being never repaired gave the village a very neglected appearance||.

Their principal musical instrument was the flute, of which they had three or four varieties. D'Urville¶ also observed among them a kind of lyre, with three or four strings. They

* Forster's Observations, l. c. p. 326.

† Dieffenbach, l. c. p. 63; Fitzroy, l. c. p. 579.

‡ D'Urville, vol. ii. p. 536.

§ Zoologist, February, 1865, p. 9454.

|| New Zealand and its Inhabitants. Taylor. p. 101.

¶ l. c. vol. ii. p. 501.

used large shells, too, as a kind of trumpet. They were very fond of singing, of poetry, and of dances. The latter were of two kinds, warlike and amorous.

In character the New Zealanders were proud, jealous, irritable, cruel, and implacable; but at the same time sensible, generous, sincere, hospitable, and affectionate. Like other Polynesians the Maories were much given to infanticide*. The girls before marriage were allowed great freedom. When once married, however, the women were faithful and affectionate to their husbands, by whom, on the other hand, they were generally treated with both kindness and respect. On the whole, it must be admitted that the position of the women among the New Zealanders was far from unsatisfactory. The Maories were perpetually at war during life, and hoped to continue so after death. Heaven they regarded as a place where there would be continual feasts of fish and sweet potatoes; where they would be always fighting, and always victorious. Whether they can be said to have had a religion, or not, depends upon the meaning we attach to the word. They believe in the survival of the soul, but not in the resurrection of the body, an article of faith which, as Mr. Marsden tells us, the missionaries could not induce them to accept. They had no idea of an Almighty Deity. Speaking to Mr. Taylor, Te Heuheu, chief of Taupo, ridiculed the idea. "Is there," he asked, "one maker of all things amongst you Europeans? Is not one a carpenter, another a blacksmith, another a ship-builder, and another a house-builder? So it was in the beginning; one God made this, another that: Tane made trees, Ru mountains, Tangaroa fish, and so forth. Your religion is of to-day, ours from remote antiquity. Do not think then to destroy our ancient faith with your freshborn religion†."

* Dieffenbach, l. c. p. 16.

† l. c. p. 13.

Their principal deity was known as the Atoua, who was a cruel cannibal like themselves. When any one was ill, Atoua was supposed to be devouring his inside, and they endeavoured to frighten him away by curses and threats*. This we may regard as a kind of negative worship; but on other occasions they certainly offered human and other sacrifices, in the vain hope of appeasing his wrath. They did not worship idols, but many of the priests seem to have really thought that they had been in actual communication with the Atoua; and some of the early missionaries were inclined to believe that Satan might have been permitted to practise a deception upon them in order to strengthen his power! However extraordinary this may appear, the same was the case in Tahiti. "In addition," says Mr. Ellis, "to the firm belief which many who were sorcerers, or agents of the infernal powers, and others who were the victims of incantation, still maintain, some of the early missionaries are disposed to think this was the fact†." Even Mr. Ellis himself was of the same opinion. With such low ideas of the Divinity, it is perhaps not surprising that some of the chiefs were looked upon as gods even during life. Watches and white men also were at first regarded as deities; the latter not, perhaps, unnaturally, their firearms being regarded as thunder and lightning.

The New Zealanders had but little regard for human life: Earle relates that a young chief named Atoi, who is described as having "a handsome open countenance," on one occasion recognized a pretty girl of about 16, who had been working for Mr. Earle, and claiming her as a runaway slave, took her back with him to his village, where he killed and ate her. The next day he showed Mr. Earle "the post to which she had been tied, and laughed to think how he had cheated her."

* Missionary Register, Nov. 1819.

† Polynesian Researches, vol. ii. p. 226.

"For," said he, "I told her I only intended to give her a flogging; but I fired, and shot her through the heart." "Yet," adds Mr. Earle, "I again affirm, that he was not only a handsome young man, but mild and genteel in his demeanour, and a general favourite with us all*."

Although the New Zealanders were addicted to cannibalism, it was with them a very different habit from that of the Feegeean. No doubt the Maori enjoyed his meals of human flesh; all people appear to have done so, who have once overcome the natural horror which must, one would suppose, have been at first experienced. But the cannibalism of a New Zealander, though often a mere meal, was also sometimes a ceremony; in these cases the object was something very different from mere sensual gratification; it must be regarded as a part of his religion, as a sort of unholy sacrament. This is proved by the fact that, after a battle, the bodies which they preferred were not those of plump young men, or tender damsels, but of the most celebrated chiefs, however old and dry they might be†. In fact, they believed that it was not only the material substance which they thus appropriated, but also the spirit, the ability, and the glory of him whom they devoured. The greater the number of corpses they had eaten, the higher they thought would be their position in the world to come. Under such a creed there is a certain diabolical nobility about the habit, which is, at any rate, far removed from the sensuality of ordinary cannibalism. To be eaten was, on the other hand, the greatest misfortune that could happen to a New Zealander; since he believed that the soul was thus destroyed as well as the body. The chief who could both kill and devour his enemy had nothing more to fear from him either in this world or the next; on the contrary, the strength, ability, and prestige against which

* Residences in New Zealand, p. 117. † D'Urville, vol. ii. p. 547.

he had had to contend, were not only conquered, but, by this dreadful process, incorporated with, and added to his own.

In other cases slaves were killed and eaten in honour of the gods. The New Zealanders declared that criminals alone were thus treated. Even if this was the case, the custom was horrible enough; but religious persecutions have scarcely ceased in Europe even now, nor is it so very long since the fire and the stake were regarded as necessary for the preservation of Christianity itself. E'hongui evidently considered that the whole analogy of nature was in favour of cannibalism. He was surprised at the horror of it felt by D'Urville. Big fish, he said, eat little fish; insects devour insects; large birds feed upon small ones; it is in accordance with the whole analogy of nature that men should eat their enemies*.

Tahiti.

Tahiti, the Queen of Islands, has excited the wonder and admiration of almost all those by whom it has been visited. In some respects the Tahitians were surpassed by other South Sea Islanders; the Feegeeans, for instance, being, as we have seen, acquainted with pottery,—but on the whole they may be taken as representing the highest stage in civilization to which man has in any country raised himself before the discovery or introduction of metallic implements. It is not, indeed, at all probable that any inhabitants of the great continents were so far advanced in civilization during their Stone Age. Doubtless, the Society Islanders would not have remained without metal, if the country had afforded them the means of obtaining it. On the other hand, the ancient inhabitants of Europe were confined to the use of

* D'Urville, vol. ii. p. 548.

stone weapons only until they became acquainted with the superiority of, and acquired the art of working in, copper, bronze, or iron; and it is evident that a nation would in all probability discover the use of metal before attaining the highest pitch of civilization which, without such aid, it would be possible for it to attain.

Fig. 111.

Stone Axe with Wooden Handle.

The tools of the Tahitians when first discovered were made of stone, bone, shell, or wood. Of metal they had no idea. When they first obtained nails, they mistook them for the young shoots of some very hard wood, and, hoping that life might not be quite extinct, planted a number of them carefully in their gardens*.

In a very short time, however, the earlier weapons were entirely replaced by those of iron; and in his last voyage Captain Cook tells us† that "a stone hatchet is, at present, as rare a thing amongst them as an iron one was eight years ago; and a chisel of bone or stone is not to be seen."

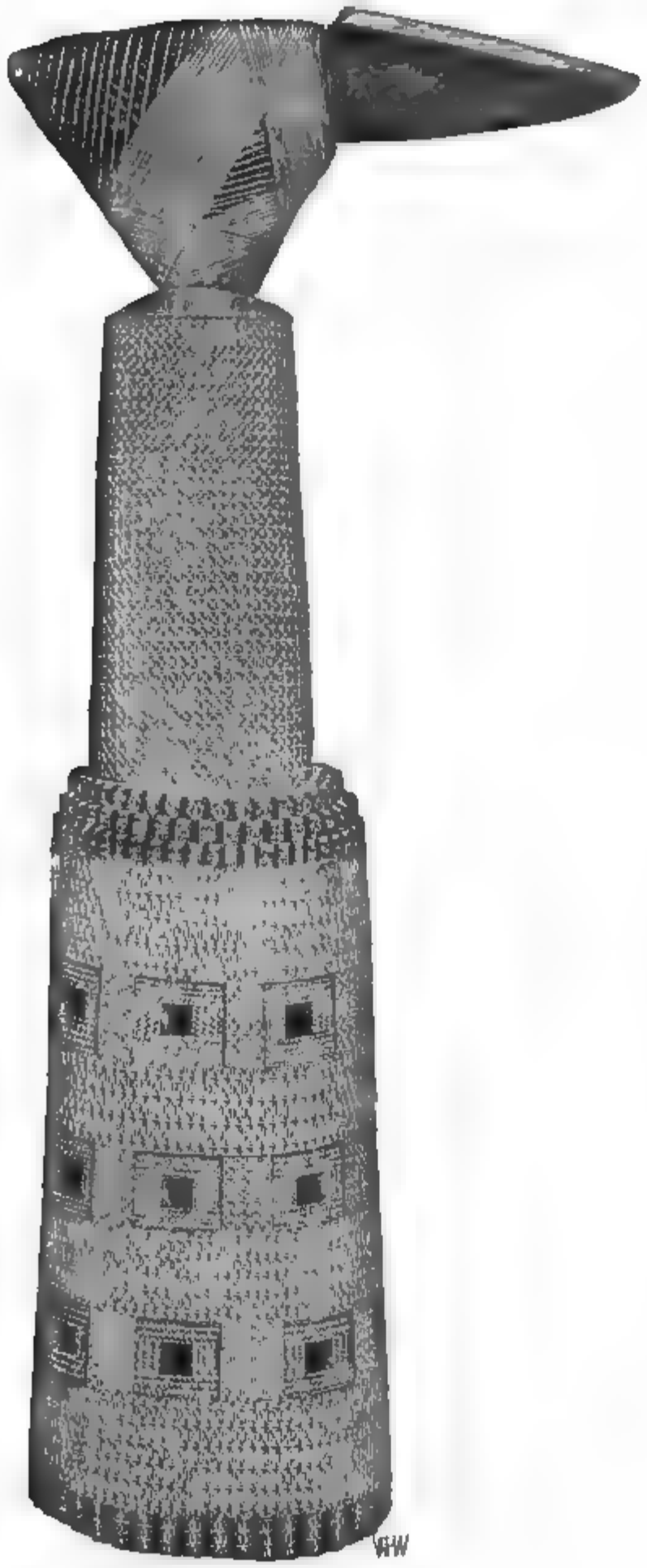
* Ellis, Polynesian Researches, p. 296.
† Voyage to the Pacific Ocean, vol. ii. p. 137.

The stone axes, or rather adzes, were of various sizes; those intended for cutting down trees weigh six or seven pounds, the little ones, which were used for carving, only a few ounces. All of them required continual sharpening, and a stone was always kept in readiness for this purpose. The natives were very skilful in the use of their adzes; nevertheless, to fell a tree was a work of several days. Some of the South Sea axes have beautifully carved handles, as in fig. 212, representing a specimen in my collection. These were axes of state. The chisels, or gouges, were of bone, generally that of a man's arm between the wrist and elbow. Pieces of coral were used as rasps, and splinters of bamboo for knives. For cultivating the ground they had instruments of hard wood, about five feet long, narrow, with sharp edges and pointed. These they used as spades or hoes*. They had fish-hooks made of mother-of-pearl, and every fisherman made them for himself. They generally served for the double purpose of hook and bait. "The shell† is first cut into square pieces, by the edge of another shell, and wrought into a form corresponding with the outline of the hook by pieces of coral, which are sufficiently rough to perform the office of a file; a hole is then bored in the middle, the drill being no other than the first stone they pick up that has a sharp corner; this they fix into the end of a piece of bamboo, and turn it between the hands like a chocolate mill; when the shell is perforated and the hole sufficiently wide, a small file of coral is introduced, by the application of which the hook is in a short time completed, few costing the artificer more time than a quarter of an hour. From the bark of the Poerou, a species of Hibiscus, they made ropes and lines, from the thickness of an inch to the size of a small packthread; with these they

* Wilson, Missionary Voyage to the South Pacific, p. 245.

† Cook's Voyage round the World, vol. i. p. 483; vol. ii. p. 218.

Fig. 212.



South Sea Axe of Ceremony.

make nets for fishing." They had also a kind of seine net, made "of a coarse broad grass, the blades of which are like flags: these they twist and tie together in a loose manner, till the net, which is about as wide as a large sack, is from sixty to eighty fathoms long; this they haul in shoal-smooth water, and its own weight keeps it so close to the ground that scarcely a single fish can escape." They also used certain leaves and fruit which, when thrown into the water, inebriated the fish to such a degree, that they might be

caught by the hands*. Their fishing-lines were made of the bark of the Erowa, a kind of nettle which grows in the mountains, and were described as "the best fishing-lines in the world," better even than our strongest silk lines. They also used the fibres of the cocoa-nut for making threads, with which they fastened together the various parts of their canoes. They were very dexterous in making basket and wicker-work, "of a thousand different patterns, many of them exceedingly neat;" they also made many sorts of mats from rushes, grass, and bark, which were woven with great neatness and regularity, although entirely by hand and without any loom or machinery†. But their principal manufacture was a kind of cloth, made from bark, and of which there were three varieties, obtained respectively from the paper-mulberry, which was the best, the bread-fruit tree, and a kind of fig. This last, though less ornamental, was more useful than either of the others, because it resisted water, which they did not. All three kinds of cloth were made in the same way, the difference between them being only in the material. When the trees were of a proper size, that is to say, about six or eight feet high, and somewhat thicker than a man's thumb, they were pulled up and the roots and branches were cut off. The bark being slit up longitudinally, it peeled off readily, and was then soaked for some time in running water. After this the green outside bark was carefully scraped off with a shell, and the strips were laid out in the

FIG. 215.

South Sea Fish-hook.

* Forster, Observations made during a Voyage round the World, p. 463; Ellis, vol. ii. p. 288.

† Ellis, vol. ii. pp. 179, 180.

evening to dry, being placed one by the side of another "till they are about a foot broad, and two or three layers are also laid one upon the other." By the morning a great part of the water had drained off or evaporated, and "the several fibres adhere together, so as that the whole may be raised from the ground in one piece." It was then placed on the smooth side of a long piece of wood, and beaten by the women-servants with a wooden instrument, shaped like a square razor-strap, and about a foot long. The four sides of this instrument were "marked lengthways, with small grooves or furrows, of different degrees of fineness; those on one side being of a width and depth sufficient to receive a small packthread, and the others finer in a regular gradation, so that the last are not more than equal to sewing silk." They beat the cloth first with the coarsest side and afterwards with the others, ending with the finest: under this treatment it expanded greatly, and might be made almost as thin as a muslin. The different pieces of bark by this treatment were so closely fastened together, that the cloth might be washed and wrung out without any fear of tearing; but even if it were accidentally broken, it was repaired without difficulty, by pasting on a patch with a gluten prepared from the root of the pea: this was done so nicely that it could not be discovered. This cloth was cool and agreeable to the touch, being even softer than our broadcloth. It is hardly necessary to say that the fineness was regulated according to the purpose for which it was intended. The two first kinds were easily bleached, and then dyed of various colours, generally red and yellow. Both of these were vegetable colours, and not very fast.

They had various strange and complicated dresses for great occasions, but their ordinary clothes were very simple, and consisted of two parts. One of them was a piece of cloth with a hole "in the middle to put the head through," and

long enough to reach from the shoulder to the knee. The other was wrapped round the waist so as to hang down like a petticoat as low as the knee; this was called the Parou. Frequently also they wore a piece of cloth tied round the head like a turban. The dress of the Queen is thus described by Ellis*: "She was attired in a light, loose, and flowing dress of beautifully white native cloth, tastefully fastened on the left shoulder, and reaching to the ankle; her hair was rather lighter than that of the natives in general; and on her head she wore a light and elegant native bonnet, of green and yellow cocoa-nut leaves; each ear was perforated, and in the perforation two or three flowers of the fragrant Cape jessamine were inserted." The dress of the men was very similar, but instead of the petticoat, they brought the cloth between the legs; this was called the Maro. In hot weather†, and at noon, both sexes went almost naked, wearing only the cloth round the waist. Besides the turbans and head-dresses of leaves, they sometimes wore long plaits of human hair, which they wound about the head in such a manner as to produce a very pretty effect. They were very clean both in their persons and their clothes; constantly washing three times a day. Ornaments were worn by the men as much as by the women, and consisted of feathers, flowers, pieces of shells, and pearls. Tattooing also was almost universal; and a person not properly tattooed would "be as much reproached and shunned, as if with us he should go about the streets naked‡." They anointed their heads frequently with perfumed cocoa-nut oil, but had no combs, which in so hot a country must have been much wanted. Notwithstanding this, the hair of the grown-up people was very neatly dressed.

* l. c. p. 148.

† The Sandwich Islanders had small square fans of mat or wicker-work, with handles of the same or of wood.

‡ Wilson, l. c. p. 355.

Their houses were used principally as dormitories. They were made of wood, and were generally about twenty-four feet long, eleven wide, and nine feet high. They had no side walls, but the roof reached to within about three feet and a half of the ground. Palm leaves took the place of thatch, and the floor was generally covered with soft hay.

The canoes resembled those of the Feegeeans, but are said to have been scarcely so well built. To prepare the planks was no easy task, but the great difficulty was to fasten them together. This was effected by "strong thongs of plaiting, which are passed several times through holes that are bored with a gouge or auger of bone*." The length of the canoes varied from ten up to ninety feet, "but the breadth is by no means in proportion; for those of ten feet are about a foot wide, and those of more than seventy are scarcely two†." These larger ones were not, however, used singly, but were fastened together side by side, in the manner already described. A canoe without an outrigger seemed to them an impossibility‡. The labour of constructing these canoes must have been very great; nevertheless, the South Sea Islanders possessed large numbers of them. On one occasion Captain Cook saw more than three hundred in one place; and, without counting the smaller vessels, he estimated the whole naval force of the Society Islands at one thousand seven hundred war canoes, manned by sixty-eight thousand men§.

Their principal musical instrument was the drum; it was made from a piece of solid wood, hollowed out, and covered over with shark's skin. They had also a kind of trumpet made of a large shell, with a hole at the small end into which they fastened a bamboo cane about three feet long. Their flutes were of bamboo, and were blown with the nose.

* Cook's First Voyage, p. 225; Forster, l. c. p. 459.

† Cook's First Voyage, p. 221.

‡ Ellis, l. c. vol. ii. p. 55.

§ Cook's Second Voyage, vol. i. p. 349.

They had various kinds of games, some of which appear to have resembled our hockey and football. They were also very fond of dancing.

They were quite ignorant of pottery, but had large dishes made of polished wood. The shells of cocoa-nuts were used as water-bottles and cups. They were scraped thin, polished, often very ingeniously carved, and kept extremely clean. Generally the natives of Tahiti sat cross-legged on mats spread on the floor; but the chiefs had often four-legged stools. Chairs and tables were unknown. They slept also on mats and used a wooden pillow, very much resembling a small stool. The upper side was curved like the seat of the stool, to admit the neck. Each house also contained a light post, planted in the floor, and with several projections, from which the various dishes, calabashes of water, baskets of food, etc., were hung*.

Their weapons were formidable, though simple. They consisted of slings, pikes headed with stone, and long clubs made of hard, heavy wood. With the former they were very skilful. Their slingstones were of two kinds, "either smooth, being polished by friction in the bed of a river, or sharp, angular and rugged; these were called *ofai ara*—faced or edged stones†." We have already mentioned (p. 101) that two sorts of slingstones, closely corresponding to these, were used by the ancient inhabitants of Europe. It would be interesting to know the relative advantage of the two classes, which surely cannot have been used for exactly the same purposes. They had also bows and arrows, which, however, were not sufficiently strong to be used in warfare. The bow-strings were made of Roava bark‡. The Society Islanders are said to have been cruel in war, but according to Captain Cook "they are seldom disturbed by either

* Ellis, l. c. vol. ii. p. 184. † Ellis, l. c. vol. ii. p. 49.
‡ Wilson, l. c. p. 368.

foreign or domestic troubles." Though not cowards, they regard it as "much less disgraceful to run away from an enemy with whole bones, than to fight and be wounded*."

"Of tame animals they had only hogs, dogs, and poultry†; neither was there a wild animal in the island, except ducks, pigeons, parroquets, with a few other birds, and rats, there being no other quadruped, nor any serpent‡." The dogs were kept entirely for food, and Captain Cook assures us that "a South Sea dog was little inferior to an English lamb; their excellence is probably owing to their being kept up, and fed wholly on vegetables." The natives preferred dog to pork. From the sea they obtained excellent fish and shell-fish. They had also bread-fruit, bananas, plantains, yams, cocoa-nuts, potatoes, the sugar cane, a fruit not unlike an apple, and several other plants which served for fruit, and required very little culture. The bread-fruit tree supplied them with abundance of fresh fruit for eight months, and during the other four they used "mahie," which is a kind of sour paste, prepared from the fermented ripe fruit. It is probable that nine-tenths of their diet consisted of vegetable food; and the common people scarcely ever tasted either pork or dog, although the hogs appear to have been very abundant.

They obtained fire by friction. When the wood was quite dry the process did not take longer than two minutes, but in wet weather it was very tedious. Having no pottery, they did not boil their food. "It is impossible," says Wallis, "to describe the astonishment they expressed when they saw the gunner, who, while he kept the market, used to dine on shore, dress his pork and poultry by boiling them in a pot; having, as I have before observed, no vessel that would bear

* Wilson, l. c. p. 363.

† Wallis' Voyage round the World; Hawkesworth's Voyages, vol. i. p. 482.

‡ Cook's Voyage round the World, p. 187.

the fire, they had no idea of hot water*." Captain Cook also expressly states that "they have but two ways of applying fire to dress their food, broiling and baking†." Mr. Tylor, however, has pointed out‡ that they were acquainted with the use of boiling-stones, and that they could not therefore have been entirely ignorant of hot water. In order to bake a hog, they made a small pit in the ground, which they paved with large stones, over which they then lighted a fire. When the stones were hot enough, they took out the embers, raked away the ashes, and covered the stones with green cocoa-nut leaves. The animal which was to be dressed, having been cleaned and prepared, was wrapped up in plantain leaves, and covered with the hot embers, on which again they placed bread-fruit and yams, which also were wrapped up in plantain leaves. Over these they spread the rest of the embers, and some hot stones, finally covering the whole with earth. The meat thus cooked is described as being tender and full of gravy; in fact, both Wallis and Cook considered that it was "better in every respect than when it is dressed in any other way." For sauce they used salt water, without which no meal was ever eaten, and a kind of thick paste made from the kernels of cocoa-nuts. At their meals they drank either water or cocoa-nut juice. The Sandwich Islanders were very fond of salt meat, and had regular salt-pans on the sea-shore§.

The only intoxicating liquor was the ava, an infusion made from the root, stalks, and leaves of a kind of pepper, which, however, fortunately for them, was entirely forbidden to the women, and seldom permitted to the lower classes. In some of the other islands this liquid is prepared in a very disgusting way. The roots were broken in pieces, cleaned, chewed, and

* l. c. vol. i. p. 484.
† Second Voyage, vol. ii. p. 197.
‡ Early History of Mankind, p. 266.
§ Cook's Third Voyage, vol. iii. p. 151.

then placed in a wooden bowl, mixed with a certain quantity of water, and stirred up with the hands. In Tahiti, however, the chewing was dispensed with. The wooden bowls out of which the chiefs drank their ava were often very fair specimens of carving. In the Sandwich Islands they are described as having been "usually about eight or ten inches in diameter, perfectly round, and beautifully polished. They are supported by three, and sometimes four, small human figures, in various attitudes. Some of them rest on the hands of their supporters, extended over the head; others on the head and hands; and some on the shoulders." These figures are said to have been "accurately proportioned and neatly finished, and even the anatomy of the muscles, in supporting the weight, well expressed*."

Captain Cook† gives an interesting description of the manner in which the chiefs dined. They had no table, and each person ate alone and in silence. Some leaves were spread on the ground to serve as a table-cloth, and a basket was set by the chief containing his provision, which, if fish or flesh, was ready dressed and wrapped in leaves. Two cocoa-nut shells were put by the side, one containing salt water and the other fresh. He first washed his hands and mouth thoroughly with the fresh water, and this he repeated almost continually through the meal. He then took part of his provision out of the basket, which generally consisted of a small fish or two, two or three bread-fruits, fourteen or fifteen ripe bananas, or six or seven apples. He began by eating some bread-fruit, at the same time breaking one of the fishes into the salt water. He then took up the bits of fish in his fingers, in such a manner as to get with it as much salt water as possible, and very frequently he took a mouthful of the salt water, either out of the cocoa-nut or in his hand. Sometimes, also, he drank the juice of a cocoa-nut.

* Third Voyage, vol. iii. p. 148. † First Voyage, vol. ii. p. 200.

When he had done his bread-fruit and fish, he began his plantains or apples, after which he ate some more bread-fruit, beaten into a sort of paste, and generally flavoured with banana or some other fruit. For a knife he used either a shell or a piece of split bamboo, and in conclusion he again washed his hands and mouth. They were quite unacquainted with forks, and Captain Wallis* tells us that, during his visit, one of the natives who "tried to feed himself with that instrument, could not guide it, but by the mere force of habit his hand came to his mouth and the victuals at the end of the fork went away to his ear." Nor did they use plates. Poulaho, Chief of the Friendly Islands, dining one day on board the ship, was so much struck by the pewter plates that Captain Cook gave him one. He did not, however, intend to employ it in the usual manner, but said that "whenever he should have occasion to visit any of the other islands, he would leave this plate behind him at Tongataboo, as a sort of representative in his absence†."

Captain Cook was much surprised to find that a people who were so sociable, and who enjoyed so much the society of women, never made their meals together. Even brothers and sisters had each their own basket, and when they wished to eat would go out, "sit down upon the ground, at two or three yards' distance from each other, and turning their faces different ways, take their repast without interchanging a single word." They ate alone, they said, "because it was right," but why it was right they were unable to explain. We must, however, remember that these islanders were together much more than we are. We enjoy a sociable meal, because the nature of our occupations keeps us apart so much at other times; but among a people whose wants were supplied with so little exertion on their part, who were all day long together, and had no rooms into which they

* Voyage round the World, p. 482. † Third Voyage, vol. i. p. 326.

could retire and be alone, it must have been a great thing to have some way of escaping from their friends and being quiet, without giving offence. As there were no stated times for meals, a man who wished to be alone need only to take out his basket of provisions, and he might be sure that he would not be disturbed. This custom, therefore, seems to have been both ingenious and convenient*.

Although they usually went to bed soon after dark, still the natives of Tahiti were not entirely without candles; for which they used the "kernels of a kind of oily nut, which they stick one over another upon a skewer that is thrust through the middle of them." These candles burned a considerable time, and are said to have given a pretty good light. The Society Islanders had no knowledge of medicine as distinct from witchcraft; but some wonderful stories are told of their skill in surgery. I will give perhaps the most extraordinary. "It is related," says Mr. Ellis, "although," he adds, with perfect gravity, "I confess I can scarcely believe it, that on some occasions, when the brain has been injured as well as the bone, they have opened the skull, taken out the injured portion of the brain, and, having a pig ready, have killed it, taken out the pig's brains, put them in the man's head, and covered them up†."

The nostrils of the female infants were often pressed or spread out during infancy, because they looked on a flat nose as a mark of beauty. In the same way the boys sometimes had their forehead and the back of their head pressed upwards, so that the upper part of the skull appeared in the

* Since the above was written, I have met with the following passage in Burchell: "I had sufficient reason for admiring one of the customs of the Bachapins; that, notwithstanding they never at any other time left me alone, they always retired the moment my dinner or breakfast was brought to me. This gave me a few moments' relief from the fatigue of incessant conversation." Travels in Southern Africa, vol. ii. p. 408.

† l. c. vol. ii. p. 277.

shape of a wedge. This was supposed to make them look more formidable in war*.

The dead were not buried at once, but were placed on a platform raised several feet above the ground, and neatly railed in with bamboo. The body was covered with a cloth, and sheltered by a roof. By the side were deposited the weapons of the deceased, and a supply of food and water. When the body had entirely decayed, the bones were collected, carefully cleaned and buried, according to the rank of the deceased, either within or without a "morai†." The largest morai seen by Captain Cook was the one prepared for Oamo and Oberea, who were the then reigning sovereigns. This was indeed the "principal piece of architecture in the island. It was a pile of stonework, raised pyramidically, upon an oblong base, or square, two hundred and sixty-seven feet long, and eighty-seven wide. It was built like the small pyramidal mounts upon which we sometimes fix the pillar of a sun-dial, where each side is a flight of steps; the steps, however, at the sides, were broader than those at the ends, so that it terminated not in a square of the same figure with the base, but in a ridge, like the roof of a house: there were eleven of these steps, each of which was four feet high, so that the height of the pile was forty-four feet; each step was formed of one course of white coral stone, which was neatly squared and polished; the rest of the mass, for there was no hollow within, consisted of round pebbles, which, from the regularity of their figure, seemed to have been wrought‡." A very similar account of this structure has

* Ellis, l. c. vol. i. p. 343.

† In some cases the head is not buried with the other bones, but is deposited in a kind of box.

‡ Cook's Voyage round the World, vol. ii. p. 166. Similar but somewhat smaller morais were observed in the Sandwich Islands (Third Voyage, vol. iii. p. 6). In the Friendly Islands, D'Urville saw a similar mausoleum built with blocks of stone, some of which were twenty feet long, six or eight broad, and two in height. They were neatly squared. l. c. vol. iv. p. 106.

been more recently given by Wilson*, who makes the size and height a little greater; and when it is considered that this was raised without the assistance of iron tools to shape the stones, or of mortar to fasten them together, it is impossible not to be struck with admiration at the magnitude of the enterprise, and the skill with which it appears to have been carried out. It is, perhaps, the most important monument which is positively known to have been constructed with stone tools only, and renders it the less unlikely that some of the large tumuli and other ancient monuments of Europe may belong to the Stone Age. When a chief died, his relations and attendants cut and mangled themselves in a dreadful manner. They ran spears through their thighs, arms, and cheeks, and beat themselves about the head with clubs "till the blood ran down in streams." They also frequently cut off the little finger on these occasions; a curious custom, which is common also in the Friendly Islands.

In Tiarrabou, Captain Cook saw a rude figure of a man, made of basket-work and about seven feet high. This was intended as a representation of one of the inferior gods, but was said to be the only one on the island; for the natives, when first discovered, though they worshipped numerous deities, to whom also human sacrifices were sometimes offered, yet were not idolaters. At a later period, however, Ellis saw among them many rude idols†. Captain Cook found their religion, "like that of most other countries, involved in mystery, and perplexed with apparent inconsistencies‡." They believed in the survival of the soul, and in "two situations of different degrees of happiness, somewhat analogous to our heaven and hell;" but, far from regarding them as places of reward and punishment, thought that the hap-

* l. c. p. 207.

† Ellis, l. c. vol. i. p. 526; Wilson, l. c. p. 242.

‡ See also Forster, l. c. p. 539.

piest lot was of course intended for the chiefs and superior classes, the other for the people of inferior rank*. Indeed, they did not suppose that their actions here in the least influenced their future state; so that their religion did not act upon them by promises or threats, and "their expressions of adoration and reverence, whether by words or actions, arise only from a humble sense of their own inferiority, and the ineffable excellence of divine perfection." However mistaken they may have been on many points, however wrong many of their customs doubtless appear to us, surely under such a creed as this, good actions become doubly virtuous, and virtue itself shines the brighter.

They had no laws, nor courts of justice. Personal security and the rights of private property were but little regarded among them. The chiefs and priests exercised an authority founded on fear and superstition. They were, in fact, governed by custom rather than by law, for which, indeed, they had no word in the language†. It is only fair to the chiefs to add that they were above being idle, and thought it a disgrace if they did not excel in all departments of labour‡. In character the inhabitants of Tahiti, according to Captain Cook, "were liberal, brave, open, and candid, without either suspicion or treachery, cruelty or revenge§." They were very anxious for education. The women were affectionate, tender, and obedient; the men mild, generous, slow to take offence, and easily satisfied. Both sexes were very healthy. "I never saw any one," says Forster||, "of a morose, peevish, discontented disposition in the whole nation; they all join to their cheerful temper a politeness and elegance which is happily blended with the most innocent simplicity of manners." Murders were very rare among them; and though

* Cook's First Voyage, vol. ii. p. 239; Ellis, vol. i. p. 518.

† Ellis, l. c. vol. ii. p. 427.

‡ Ellis, l. c. vol. ii. p. 178.

§ First Voyage, vol. ii. p. 188.

|| l. c. p. 582.

much licence was permitted to the young women before marriage, the married women, according to Captain Cook*, were as well behaved "as in any other country whatever." They were very thievish; but we must consider the immense temptations to which they were subjected, and the, to them, inestimable value of the articles which they stole. Like other savages, they resembled children in many respects, their sorrows were transient, their passions suddenly and strongly expressed. On one occasion, Oberea, the queen, who was then about forty years old, took a particular fancy to a large doll, which was accordingly presented to her. Shortly afterwards they met Tootahah, one of the principal chiefs, who became so jealous of Oberea's doll, that they were obliged to give him one also.

There are scarcely any nations, whether barbarous or civilized, in which the relations of the two sexes are on the whole satisfactory. Savages, almost without exception, treat their women as slaves, and civilized nations too often avoid this error only to fall into others.

The inhabitants of Tahiti are said to have been absolutely without any ideas of decency, or rather as Captain Cook puts it, perhaps more correctly, "of indecency." This no doubt arose in part from their large open houses, which were not divided into separate rooms. However this may be, where there was no sin, they saw no shame, and it must be confessed that in many points their idea of sin was very different from ours. Before, however, we condemn them, let us remember that a dinner-party would have seemed as wrong to them as many of their customs do to us. If the freedom, both in language and in action, which they permitted to themselves, seems to us in many respects objectionable, we must not forget that our ideas of delicacy shut out from general conversation numerous subjects of great interest and

* Voyage to the South Pole, vol. i. p. 187.

importance, and throw round many matters of the utmost importance an air of mystery which is not without serious disadvantages.

A considerable number of the principal people of both sexes in Tahiti were formed into an association called the "Arreoy," all the members of which were regarded as being married to one another. If any of the women of the society had a child, it was almost invariably killed: but if it was allowed to live, the father and mother were regarded as having definitively engaged themselves to one another, and were ejected from the association; the woman being known from that time as a "bearer of children," which was among this extraordinary people a term of reproach. The existence of such a society shows how fundamentally the idea of virtue may differ in different countries. Yet the married women were faithful to their husbands, and beautifully modest. It is impossible, indeed, to acquit even them of the charge of infanticide, for which we may find a cause, though not an excuse. I do not allude to the curious custom, that a child, as soon as it was born, inherited the titles, rank, and property of its father, so that a man who was yesterday a chief might be thus at once reduced to the condition of a private person; nor to the fact that any Arreoy who spared her infant was at once excluded from that society. We cannot suppose that such customs were without their effect; but a more powerful reason may perhaps be found in the fact, that their numbers were already large, the means of subsistence limited, and that, as but few were carried off either by disease or in war, the population would soon have outgrown their supplies, if some means were not taken to check the natural increase of numbers*. However this may be, infanticide appears to have been dreadfully prevalent amongst them. It has been estimated that two-thirds of the children

* See, for instance, Kotzebue's New Voyage, vol. i. p. 308.

were destroyed by their own parents*, and both Mr. Nott and Mr. Ellis agree that, during the whole of their residence in the island, until the adoption of Christianity, they did not know a single case of a mother who had not been guilty of this crime.

According to Wilson †, their language contained no word for "thanks," and even Cook admits that they had no respect for old age. Fitzroy goes still farther, and assures us that "they scrupled not to destroy their aged or sick—yes, even their parents, if disabled by age or sickness‡." No such accusation is, however, brought against them by earlier writers, so that such actions are probably very rare, and the result, as among the Feegeeans, of misdirected affection rather than of deliberate cruelty.

They had no money; and though it was easy to obtain the necessaries of life, to accumulate property was almost impossible. Again, the absence of spirituous liquors, and the relations between the sexes (however unsatisfactory in other respects), took away from them some of the principal incentives to crime. On the whole, then, if we judge them by a South Sea standard, the natives of the Society Islands appear to have been very free from crime.

In spite of the differences which sometimes arose in consequence of their thievish disposition, and also perhaps in great measure from their not being able perfectly to understand each other, Captain Cook and his officers lived with the natives "in the most cordial friendship," and took leave of them with great regret. Mr. Ellis, on the contrary, assures us that "no portion of the human race was ever perhaps sunk lower in brutal licentiousness and moral degradation than this isolated people§." Such a statement is surely quite inconsistent with the account he gives of their anxiety to

* Ellis, vol. i. pp. 334. 336.
† l. c. p. 365.
‡ l. c. vol. ii. p. 551.
§ Ellis, l. c. vol. ii. p. 25.

possess copies of the Bible when it was translated into their language. "They were," he says, "deemed by them more precious than gold—yea, than much fine gold," and "became at once the constant companion of their possessors, and the source of their highest enjoyment*."

The inhabitants of the Friendly, or Tonga, and of the Sandwich Islands, are also very well described by Captain Cook, but they belonged to the same race as those of Tahiti and New Zealand, and resembled them in religion, language, canoes, houses, weapons, food, habits, etc. It is somewhat remarkable that the Sandwich Islanders, in many respects, as for instance in their dances, houses, tattooing, etc., resembled the New Zealanders even more than their nearer neighbours in the Society and Friendly Islands. In the Friendly Islands Captain Cook observed a very singular luxury in which the chiefs indulged themselves. When one of them wished to go to sleep, two women came and sat by him, "beating briskly on his body and legs with both fists, as on a drum, till he fell asleep, and continuing it the whole night, with some short intervals." When the chief is sound asleep they sometimes rest themselves a little, "but resume it if they observe any appearance of his waking†." A similar statement is made by Wilson in his Missionary Voyage‡. In all the islands the chiefs appear to have been treated with respect, none the less profound because shown in ways which seem to us peculiar. One of them was to uncover the body from the waist, and it seems to have been a matter of indifference, or rather of convenience, whether this was done upwards or downwards§. In the Friendly Islands it was accounted a striking mark of rudeness to speak to the king while standing up.

* Ellis, l. c. vol. i. pp. 393–408.
† Third Voyage, vol. i. p. 323.
‡ l. c. p. 237.
§ Cook's First Voyage, vol. ii. p. 125.

There was also a certain amount of commerce between the different islands. Bora-bora and Otahaw produced abundance of cocoa-nut oil, which was exchanged at Tahiti for cloth. The Low Islands, again, could not successfully grow the paper-mulberry; but they had a breed of dogs with long silky hair, which was much prized in the other islands.

CHAPTER XIV.

MODERN SAVAGES—*continued.*

Esquimaux.

THE Esquimaux, and the Esquimaux alone among savage races, occupy both the Old and the New World. They inhabit the shores of the Arctic Ocean from Siberia to Greenland; and throughout this great extent of country the language, appearance, habits, occupations, and weapons of the natives are very similar, and it must be added that the latter are most ingenious. The language of the Innuit, or Esquimaux, is akin to that of the North American Indians in structure, while their appearance has a decided likeness, particularly about the eyes, to the Chinese and Tartars.

Their dwellings are of two kinds. The summer they pass in tents or wigwams, with the entrance to the south or south-east. In those observed by Captain Parry, the tent-poles were, in the absence of wood, formed of stags' horns, or bones lashed together. The lower borders of the skins were held down by large stones. These were sometimes built up into regular circles, eight or nine feet in diameter and four or five feet high*. These circles were at first supposed to be the remains of winter-houses; but it was subsequently ascertained that they were exclusively used for extending the skins of the summer-tents. Near these "hut circles" long rows of standing stones were several times

* Parry's Voyage, 1821–23, pp. 17. 51.

observed*. The winter-houses in the southern districts are constructed of earth or drift-timber, which is very abundant in some places. In the north, however, wood becomes extremely rare. The Esquimaux at the northern end of Baffin's Bay†, who had no wood, excepting twigs of a dwarfish heath, were so little acquainted with the nature of timber that several of them successively seized on the spare top-mast of the "Isabella," evidently with the intention of stealing it, and quite unconscious of its weight. In the absence of wood their houses were built of ice and snow; those of ice are beautiful, and almost transparent, so that even at some little distance it is possible to see every thing that takes place in them. They are, however, much colder than those of snow, which therefore are generally preferred. West of the Rocky Mountains, the winter houses were usually underground. A Kamskatchadale "yourt" is thus described by Captain Cook‡: "An oblong square, of dimensions proportionate to the number of persons for whom it is intended (for it is proper to observe that several families live together in the same *jourt*), is dug into the earth to the depth of about six feet. Within this space strong posts, or wooden pillars, are fastened in the ground, at proper distances from each other, on which are extended the beams for the support of the roof, which is formed by joists resting on the ground with one end, and on the beams with the other. The interstices between the joists are filled up with a strong wicker-work, and the whole covered with turf; so that a jourt has externally the appearance of a low round hillock. A hole is left in the centre, which serves for chimney, window, and entrance, and the inhabitants pass in and out by means of a strong pole (instead of a ladder) notched deep enough to

* l. c. pp. 62, 285, 363.

† Ross, Baffin's Bay, p. 122.

‡ Cook's Voyages to the Pacific Ocean, vol. iii. p. 374. See also vol. iii. p. 450.

afford a little holding for the toe, as in fig. 141 (p. 132)." More often, however, the entrance consisted of a sunken passage, as in fig. 141* (p. 133) or fig. 143 (p. 158).

As a general rule we may say that the western yourts are subterranean, while those of the tribes who live east of the Rocky Mountains are generally above ground. The manner in which the Esquimaux construct their snow igloos has been well described by Captain Parry. They choose* a drift of hard and compact snow, and from this they cut oblong slabs, six or seven inches thick and about two feet in length. With these they build a circular wall, inclining inwards so as to form a dome, which is sometimes as much as nine or ten feet high and from eight to fifteen feet in diameter. A small door is then cut on the south side. It is about three feet high, two and a half wide at the bottom, and leads into a passage about ten feet long, and with a step in the middle, the half next the hut being lower than either the floor of the hut or the outer passage. For the admission of light a round hole is cut on one side of the roof and a circular plate of ice, three or four inches thick and two feet in diameter, is let into it. If several families intend to live together, other chambers are constructed which open into the first, and then after a quantity of snow has been shovelled up on the outside, the shell of the building is regarded as finished. The next thing is to raise a bank of snow two and a half feet high all round the interior of the building, except on the side next the door. This bank forms the bed. Over it is laid some gravel, upon that again paddles, tent-poles, pieces of whalebone, twigs of birch and of andromeda, etc., and finally a number of deer-skins, which form a soft and luxurious couch. They have no fireplace, properly so called, that is to say, no hearth, but each family has a separate lamp

* Parry, l. c. p. 500.

or shallow vessel generally made of lapis ollaris, in which they burn seal's-oil, with a wick made of dry moss.

Although they had no knowledge of pottery, Captain Cook saw at Unalashka vessels "of a flat stone, with sides of clay, not unlike a standing pye*." We here obtain an idea of the manner in which the knowledge of pottery may have been developed. After using clay to raise the sides of their stone vessels, it would naturally occur to them that the same substance would serve for the bottom also, and thus the use of stone might be replaced by a more convenient material.

The natives of the Lower Murray cook their food in a hollow in the ground, which they line with clay, and in other cases gourds and wooden vessels are coated with clay in order to enable them to stand heat. Thus we see three ways in which pottery may have been invented.

The snow-houses melt away every spring; but in some places the Esquimaux construct their dwellings on a similar plan, but with the bones of whales and walruses on a foundation of stones, and with a covering of earth. The snow-houses are of course pretty clean at first, but they gradually become very filthy. The bone-huts are even dirtier, because more durable. "In every direction round the huts," says Captain Parry, "were lying innumerable bones of walruses and seals, together with skulls of dogs, bears, and foxes, on many of which a part of the putrid flesh still remaining sent forth the most offensive effluvia†." He even observed a number of human bones lying about among the rest‡. The inside of the huts, "from their extreme closeness and accumulated filth, emitted an almost insupportable stench, to which an abundant supply of raw and half-putrid walrus flesh in no small degree contributed§."

* Cook's Voyage to the Pacific Ocean, vol. ii. p. 510.

† Parry, l. c. p. 280.

‡ See also Lyon's Journal, p. 236.

§ Parry, l. c. p. 358.

On the north-western coast of America the natives find plenty of drift-wood, and the floors of their yourts are, according to Belcher, made of split timber, nicely smoothed and carefully caulked with moss. Underneath is often a large store-room, for in summer they kill many reindeer, whales, walrus, seals, swans, ducks, etc., the greater part of which are laid by for winter use. One of these winter stores is thus expressively, though somewhat hastily, described by Sir E. Belcher*: "It was frozen into a solid mass beneath, but loose from those on the surface, and seemed to be incorporated, by some unexplained process, into a *gelatinous snow*, which they scraped up easily with the hand and ate with satisfaction—fish oil predominating. It was not offensive nor putrid. How many years the lower mass may have remained there I could not determine; but estimating the supply in one yourt as proportioned for ten people—the allowance of inhabitants for each yourt—the daily proportion for the complete store would allow for three hundred days, or about twenty-four pounds per soul." He estimates the quantity of solid meat in this storehouse alone at 71,424 pounds. Captain Ross also mentions† the large stores of food laid up by the Esquimaux of Boothia Felix during the summer for winter use. The habit does not, however, appear to be general among the Esquimaux, though they all of them make "caches" of meat under stone cairns.

Charlevoix derives the name Esquimaux from the Indian word *Eskimantsik*, which means "eaters of raw food;" many of these northern tribes being in the habit of eating their meat uncooked. We must in justice to them remember that several of our Arctic Expeditions have adopted the

* Trans. Ethn. Soc., New Ser., vol. i. p. 132.

† Narrative of a Second Voyage, p. 251; and Appendix, p. 21. See also Hall's Life with the Esquimaux, vol. ii. p. 311; Kane's Arctic Explorations, vol. ii. p. 133.

same custom, which seems indeed in those latitudes highly conducive to health*.

Their food if cooked at all is broiled or boiled. Their vessels being of stone or wood cannot, indeed, be put on the fire; but heated stones are thrown in until the water becomes hot enough, and the food is cooked. Of course, the result is a mess of soot, dirt, and ashes, which would, according to our ideas, be almost intolerable; but if the stench of their houses does not take away a man's appetite, nothing else would be likely to do so. They never wash their pots or kettles; the dogs save them this trouble. Those who have arrived at a dim consciousness of their dirtiness, do generally but make matters worse, for if they wish to treat a guest "genteelly, they first lick the piece of meat he is to eat clean from the blood and scum it has contracted in the kettle, with their tongue; and should any one not kindly accept it, he would be looked upon as an unmannerly man for despising their civility†." The Esquimaux observed by Dr. Rae at Repulse Bay were, however, much cleaner in their habits.

Their food consists principally of reindeer, musk ox, walrus, seals, birds, and salmon. They will, however, eat any kind of animal food. They are very fond of fat and marrow, to get at which they pound the bones with a stone. The southern tribes get a few berries in summer, but those who live in the north have scarcely any vegetable food except that which they obtain in a half-digested form from the stomach of the reindeer, and this they regard as a great delicacy‡; the northernmost of all, being unable to kill reindeer, are entirely deprived of vegetable food.

"I was once present§," says Captain Cook, "when the chief of Oonalashka made his dinner of the raw head of a

* See, for instance, Kane's Arctic Explorations, vol. ii. p. 14.

† Crantz, p. 168; Parry, Second Voyage, p.293; Lyon's Journal, p.142.

‡ Ross, Narrative of a Second Voyage, p. 352.

§ Cook's Third Voyage, vol. ii. p. 511.

large halibut, just caught. Before any was given to the chief, two of his servants eat the gills, without any other dressing besides squeezing out the slime. This done, one of them cut off the head of the fish, took it to the sea and washed it, then came with it and sat down by the chief: first pulling up some grass, upon a part of which the head was laid, and the rest was strewed before the chief. He then cut large pieces off the cheeks, and laid these within the reach of the great man, who swallowed them with as much satisfaction as we should do raw oysters. When he had done, the remains of the head were cut in pieces, and given to the attendants, who tore off the meat with their teeth, and gnawed the bones like so many dogs."

Captain Lyon gives an even more disgusting account of an Esquimaux meal. "From Kooilittuck*," he says, "I learnt a new Esquimaux luxury: he had eaten till he was drunk, and every moment fell asleep, with a flushed and burning face, and his mouth open: by his side sat Arnalooa (his wife), who was attending her cooking-pot, and at short intervals awakened her spouse, in order to cram as much as was possible of a large piece of half-boiled flesh into his mouth with the assistance of her forefinger, and having filled it quite full, cut off the morsel close to his lips. This he slowly chewed, and as soon as a small vacancy became perceptible, this was filled again by a lump of raw blubber. During this operation the happy man moved no part of him but his jaws, not even opening his eyes; but his extreme satisfaction was occasionally shown by a most expressive grunt, whenever he enjoyed sufficient room for the passage of sound. The drippings of the savory repast had so plentifully covered his face and neck, that I had no hesitation in determining that a man may look more like a beast by over-eating than by drinking to excess. The women having

* Lyon's Journal, p. 181; see also Ross, l. c. p. 448.

fed all their better halves to sleep, and not having neglected themselves, had now nothing to do but to talk and beg as usual.

A feast among some of the more civilized Esquimaux of Greenland is thus described by Crantz*. "A factor being invited to a great entertainment with several topping Greenlanders, counted the following dishes: 1. Dried herrings. 2. Dried seal's flesh. 3. Boiled ditto. 4. Half raw and rotten ditto, called Mikiak. 5. Boiled willocks. 6. A piece of a half rotten whale's tail: this was the dainty dish or haunch of venison to which the guests were properly invited. 7. Dried salmon. 8. Dried reindeer venison. 9. A dessert of crowberries mixed with the chyle out of the maw of a reindeer. 10. The same, enriched with train oil."

Their drink consists of blood or water: during the greater part of the year they have considerable difficulty in obtaining sufficient water to satisfy their thirst, and it is much too precious to be used for washing. It may seem surprising that people who are surrounded by snow and ice should suffer from want of water, but the amount of heat required to melt snow is so great, that a man without the means of obtaining fire might die of thirst in these arctic regions as easily as in the sandy deserts of Africa. Any direct "resort to snow," says Kane, "for the purpose of allaying thirst, was followed by bloody lips and tongue; it burnt like caustic†." When the Esquimaux visited Captain Parry, they were always anxious for water, which they drank in such quantities "that it was impossible to furnish them with half as much as they desired‡." In the extreme north one of the principal duties of the women in the winter is to thaw snow over their lamps, feeding the wick with oil, if it does not rise well of its own

* History of Greenland, vol. i. p. 172.

† Arctic Explorations, vol. i. p. 190.

‡ l. c. p. 188.

accord*; the natural heat of the room is not sufficient to melt snow, as the temperature of the huts is always kept, if possible, below the freezing-point. In South Greenland, however, the huts are built of turf, etc., and are very warm†. But we must remember that coolness, rather than heat, is required by the Esquimaux who live in snow dwellings, because if the temperature rises to thirty-two degrees, the continual dripping from the roof produces extreme inconvenience, and, in fact, the most unhealthy season is the spring, when the weather is too warm for snow huts, and too cold for tents. Thus, therefore, the Esquimaux, though living in a climate so extremely rigorous, would be debarred from the use of fires by the very nature of their dwellings, even if they were able to obtain the necessary materials. They never, says Simpson, "seem to think of fire as a means of imparting warmth‡;" their lamps are used for cooking, for light, and for melting snow and drying clothes, rather than to warm the air§, and as, nevertheless, the body temperature of the Esquimaux is almost the same as ours, it is evident that they must require a large amount of animal food. The quantity of meat which they consume is astonishing; and it is worthy of remark that, from the scarcity of wood in the far north, they use the same substance for food and fuel; the calorific material being the same—namely, blubber—whether the heat is to be obtained by digestion or combustion; whether the material is to be placed in a lamp and burnt, or to be eaten and digested. In summer, however, when it is less necessary to keep down the general temperature, they sometimes burn bones well saturated with oil. For obtaining fire the Esquimaux generally use lumps of iron pyrites and quartz, from which they strike sparks on to

* Osborn's Arctic Journal, p. 17.
† Egede, l. c. p. 116.
‡ Discoveries in North America, p. 346.
§ Kane, l. c. vol. ii. p. 202.

moss which has been well dried and rubbed between the hands*. They are also acquainted with the method of obtaining it by friction†, which is a slower and more laborious process. It appears, however, to be the one generally pursued by the Greenland Esquimaux‡.

It has been generally assumed that man could scarcely live in temperate climates, and certainly not in the arctic regions, without the advantage of fire. From the above facts, however, as well as from others which will presently be recorded, it may be doubted whether this is really the case. Esquimaux do not use fire to warm their dwellings, and cookery is with them a refinement. In fact, those Esquimaux who live on reindeer, more than on seal, having little blubber, make hardly any use of fire.

In the South the men have bows and arrows, harpoons, spears, lines, fish-hooks, knives, snow-knives, ice-chisels, snow-shovels, groovers, drill-bows, drills, etc. The women have lamps and stone-kettles, lamp moss, pieces of iron-pyrites, bone-needles, pieces of sinew, scrapers (figs. 105–107), horn spoons, sealskin vessels, pointed bones, marrow-spoons, and knives (figs. 214–216). They have generally also, according to Dr. Rae, a small piece of stone, bone, or ivory, about six inches long and half an inch thick; this is used for arranging the wicks of the lamps.

Kane gives the following inventory of an Esquimaux hut visited by him; a sealskin cup, for gathering and holding water; the shoulder-blade of a walrus, to serve as a lamp; a large flat stone to support it; another large, thin, flat stone to support the melting snow; a lance-head, with a long coil of walrus line; a stand for clothes; and the clothes themselves completed the whole worldly goods of this poor family§.

* Kane, l. c. vol. i. p. 379; Parry, l. c. p. 504; Ross, l. c. p. 513.

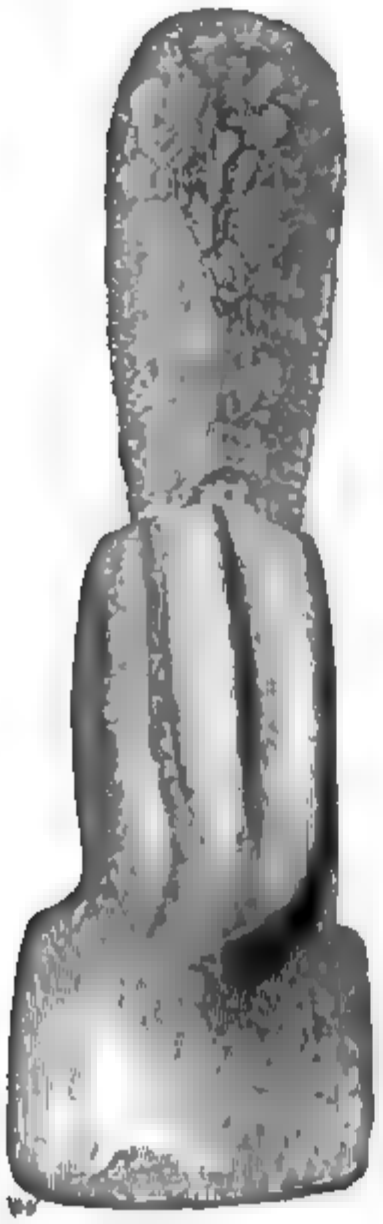
† Lyon's Journal, p. 290.

‡ Egede, l. c. p. 138.

§ Kane's Arctic Explorations, vol. i. p. 381.

On their travelling expeditions even less than this is necessary; raw meat and a fur bag are all that they require.

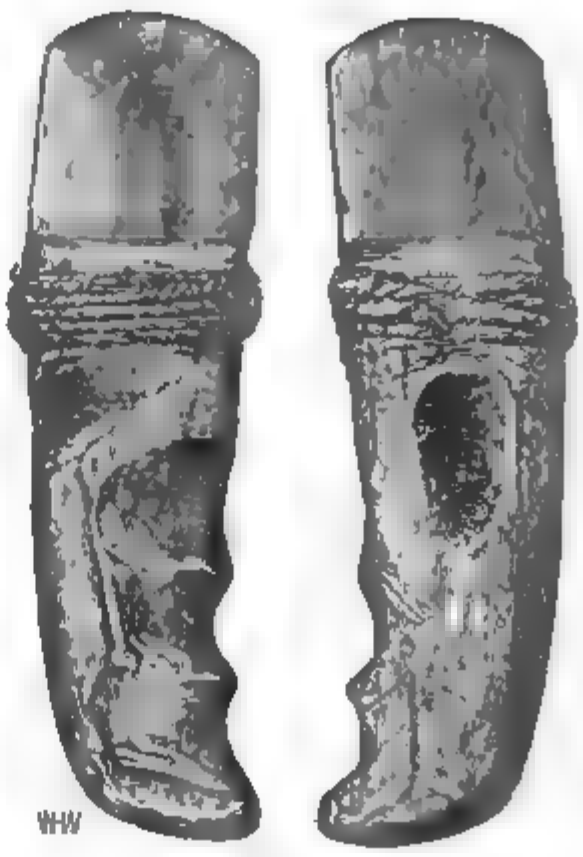
Fig. 214.



Esquimaux Knife.

Fig. 215.

Fig. 216.



Esquimaux Knife.

The implements of the Esquimaux are very ingenious. Besides knives resembling those figured above, the women use others of a semicircular form, and very similar to the curious semilunar knives (pl. 1., fig. 3) which are so common in Denmark. They are, however, now made of metal, which the Southern Esquimaux have been enabled to obtain, though in small quantities, from the Europeans. Some few of them also break off bits of meteoric iron, which

they hammer to an edge, and then fix in a handle of horn or bone. The arrow-heads are of several kinds and shapes. Those of stone (fig. 217) are made, not by blows, but by pressure, for which purpose they use the point of reindeer's horn, set in bone; bone itself would not be tough enough. Other arrow-heads are of horn; these often bear "owners' marks" as may be seen by fig. 2 (p. 10). The shafts of the arrows are short, straightened by steam, and provided with feathers at the butt end. These are fastened on by deer sinews. The bows are generally of wood, either made of one piece steamed into the right form, or of three parts most ingeniously fastened together, and strengthened by pieces of bone or sinew. When wood cannot be obtained, they use bone or horn. They do not appear to be particularly good shots: but Captain Parry* thinks that they would generally hit a deer from forty to forty-five yards, if the animal stood still†. Moreover against large game they are, after all, not very effective. Sir J. C. Ross gives an interesting account of a musk-sheep hunt which he witnessed. At length becoming impatient, as the Esquimaux "continued to shoot without apparent effect, finding his opportunities for an aim with much difficulty, and losing much time afterwards in recovering his arrows, Sir James fired, and broke the animal's shoulder-blade, to the immense astonishment of his companion‡."

Fig. 217.

Arrow head.

The spears are made like the arrows, but are larger; the heads also are frequently barbed, and in many cases fit loosely

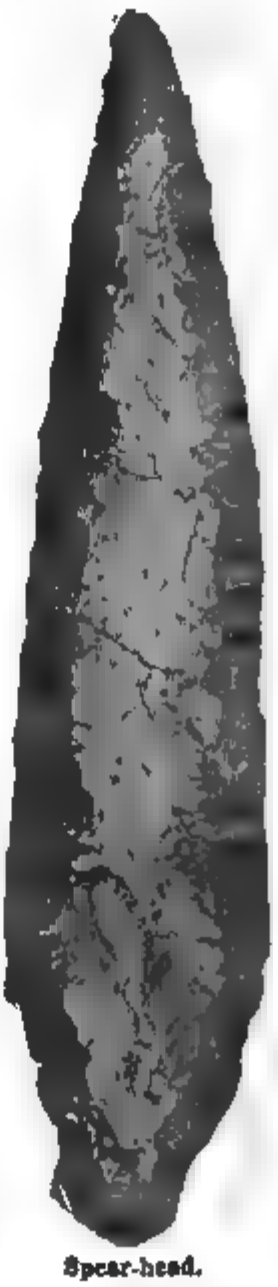
* l. c. p. 511.

† The Esquimaux of Greenland have long abandoned the bow and arrow, using guns obtained from the Danes. In many other respects also their ancient habits have been modified, and their condition greatly improved, by this intercourse.

‡ Sir J. Ross' Arctic Expedition, 1829–33, p. 350.

into the shaft, but are securely fastened to a long leathern thong, which is tied to the butt end of the spear. For throwing the harpoon they use a short handle or throwing stick, about two feet long, narrow below, four inches wide above, and with a notch on each side for the thumb and forefinger. With these weapons they attack not only seals and walruses, but even whales. They strike the whale, if possible, at the same time with many harpoons, "to which bladders are hung, made of great seal-skins, several of which so encumber and stop the whale, that it cannot sink deep. When he is tired out, they despatch him quite with their little lances." Kane gives the figure of a lance, the blade of which closely resembles one of the longer "axes" from the Danish-shell-mounds*.

Fig. 218.



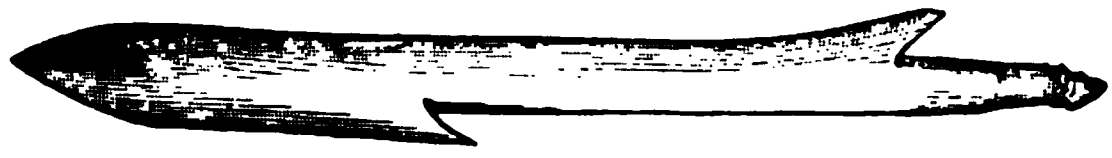
Spear-head.

The Esquimaux have three principal ways of killing seals. The commonest is with the harpoon and bladder. When an Esquimaux in his kayak "spies a seal, he tries to surprise it unawares with the wind and sun in his back, that he may not be heard or seen by it. He tries to conceal himself behind a wave, and makes hastily but softly up to it till he comes within four, five, or six fathoms of it; meanwhile he takes the utmost care that the harpoon, line, and bladder lie in proper order†." As soon as the seal is struck the point of the spear detaches itself from the shaft, and at the same moment the Esquimaux throws the large air bladder on to the water. This is often dragged under water a little way, but it is so great an impediment, that

* Arctic Explorations, vol. ii. p. 129. † Crantz, p. 154.

the seal is soon obliged to come up. "The Greenlander hastens to the spot where he sees the bladder rise up, and smites the seal as soon as it appears" with the great lance, or "angovigak." This is not barbed, and does not therefore remain in the seal's body, but can be used again and

FIG. 219.



Bone Harpoon.

again until the animal is exhausted. The second way is the "clapper-hunt." If the Esquimaux find, or can drive any seals into the creeks or inlets, they frighten them by shouting, clapping, and throwing stones every time they come up to breathe, until at last they are exhausted and easily killed. In winter, when the sea is frozen, the seals, which are obliged to come up from time to time for the sake of air, keep open certain breathing-holes for this purpose, and the Esquimaux, when he has found one of these, waits patiently till the seal makes its appearance, when he kills it instantly with his harpoon.

The Esquimaux are excellent deerstalkers, and are much assisted by the skill with which they can imitate the cry of the reindeer. Fish are caught sometimes with the hook and line, sometimes by means of small nets when they come to the shore in shoals to spawn, or finally with the spear. The nets are made of "small hoops or rings of whalebone, firmly lashed together with rings of the same material*." The fishing-lines also are made of whalebone†. Salmon are sometimes so abundant, that in Boothia Felix, Captain Ross bought a ton weight for a single knife. For killing birds they use an instrument in some respects like the "bolas" of South America: a number of stones or walrus teeth being fastened to short pieces of string, and all the strings then

* Parry, l. c. p. 100.

† Egede, l. c. p. 107.

tied together at the other end*. The spears, which are intended to be thrown at birds or other small animals, have a double fork at the extremity, and three other barbed points near the middle. These diverge in different directions, so that if the end pair should miss, one of the central trio might strike the victim. Aquatic birds are also caught in whalebone nooses; but "the moulting season is the great bird-harvest, as a few persons wading into the shallow lakes, can soon tire out and catch the birds by hand†."

The so-called "Arctic Highlanders," however, are said to have no means of killing the reindeer, though it abounds in their country; nor have they the art of fishing, although, curiously enough, they catch large numbers of birds in small hand-nets. Seals, bears, walrus, and birds constitute almost the whole of their diet‡. Neither the American nor Greenland Esquimaux have succeeded in taming the reindeer. Dogs are their only domestic animals, and are sometimes used in hunting, but principally to draw the sledges.

The sledges vary much both in materials and form: according to Captain Lyon the best are made of the jaw-bones of the whale, sawn to about two inches in thickness, and from six inches to a foot in depth. These are the runners, and are shod with a thin plank of the same material. The sides are connected by pieces of bone, horn, or wood, firmly lashed together. In Boothia, Captain Ross saw sledges in which the runners were made of salmon, packed into a cylinder, rolled up in skins, and frozen together. In spring the skins are made into bags, and the fish are eaten§. Altogether these sledges are well constructed, when it is considered with what simple tools they are made.

The dogs by which these sledges are drawn are by no

* Simpson, l. c. p. 156.

† Lyon's Journal, p. 338.

‡ Kane, Arctic Explorations, vol. ii. pp. 208, 210. See also Richardson's Arctic Expedition, vol. ii. p. 25; Simpson's Discoveries in North America, p. 347; Ross, l. c. p. 585.

§ l. c. Appendix, p. 24.

means easy to manage. Each has a separate trace attached to the front of the sledge, passing between the legs, and fastened in front to a collar. The dogs therefore are nearly abreast, and the traces are very liable to become entangled. The team is guided by throwing the lash of the whip on one side or the other, and repeating certain words. "Wōōa," as among our carters, means "Stop*."

Their boats also are very ingeniously built, and are of two kinds, the kajak or men's boat, and the umiak or women's boat. The kajak is from eighteen to twenty feet long, eighteen inches broad in the middle, tapering to both ends, and scarcely a foot deep. It has no outriggers, and is therefore very difficult to sit. It is quite covered over at the top, with the exception of a hole in the middle, into which the Esquimaux puts his legs. The boat therefore cannot fill with water, and even if it upsets, they can right it again by a sudden jerk of the oar, or rather paddle. Indeed, a skilful Esquimaux will turn somersaults in the water, in his boat with great ease. In spite of this they are frequently drowned; and indeed so dangerous is the navigation that they generally go in pairs, so as to assist one another on an emergency, for the skin sides of the kajak are very thin, and, if they come in contact with any of the floating ice or drift-timber which abound in the Greenland seas, are liable to be torn open, in which case the unfortunate Esquimaux has little chance of saving himself. The umiak is much larger, and has a flat bottom. It is made of slender laths, fastened together with whalebone, and covered over with sealskins. The Esquimaux observed by Ross, at the northern end of Baffin's Bay, were entirely without canoes, and were "ignorant, even traditionally, of the existence of a boat†." It is, as he justly observes, an extraordinary thing to find "a

* Parry's Three Voyages for the Discovery of a N.W. Passage, vol. iv. p. 310.
† Ross, Baffin's Bay, p. 170.

maritime and a fishing tribe unacquainted with any means of floating on the water;" but we must remember that they had no wood, and that there were only a few weeks in the year when the sea was unfrozen. No wonder that Ross's ships were mistaken for living creatures*, and that his boats excited the most unbounded astonishment and admiration. Kane also† confirms the absence of boats, but he adds "that the kayack *was* known to them traditionally."

In the preparation of skins the Esquimaux use certain stone instruments (figs. 105–107), which have frequently been overlooked on account of their simplicity, but which yet are interesting because they are exactly similar to certain ancient implements which are very common in various parts of Europe, and have been already described in page 92. The collection made by my lamented friend, Mr. Christy, contains four of these skin-scrapers, three of which were obtained from the Esquimaux north of Behring's Straits. These are set in fossil ivory. The fourth was found in a Greenland grave, probably not older than the fifteenth century, and belonging to the Stone period which supervened when the intercourse with Norway was suspended. Some archæologists had considered that the "scrapers" were "probably knives, the prolonged thick ends of which were intended for handles, to be held between the finger and thumb, or possibly for attachment to a short wooden shaft‡." The true nature and use of the ancient skin-scrapers has, however, been entirely explained by these modern specimens, with which they are absolutely identical. The method of preparing skins is curious and ingenious, but very disgusting.

The clothes of the Esquimaux are made from the skins of reindeer, seals, and birds, sewn together with sinews. For needles they use bones either of birds or fishes; yet

* l. c. p. 118. † Kane, Arctic Explorations, vol. ii. pp. 135, 210.

‡ See Archæologia, vol. xxxviii. p. 415.

with these simple instruments they sew very strongly and well. The outer dress of the men resembles a short great-coat, with a hood that can be pulled over the head if necessary, and which serves as a substitute for a hat or cap. Their under-garments or shirts are made of bird-skins, with the feathers inwards, or of skins with the hair inside; sometimes, however, they wear in addition another shirt made of seal's entrails. Their breeches, "of which in winter they also wear two pair, and similarly disposed as to the fur*," are either of seal-skin or reindeer-skin, and their stockings of skins from very young animals. The boots are of smooth black dressed seal's leather, and sometimes when at sea they wear a great overcoat of the same material. Their clothes are generally very greasy and dirty, and swarm with lice. The dress of the women does not differ much from that of the men.

Their principal ornaments are cheek-studs (fig. 220), or pieces of polished stone or bone, which are worn in the lower lip or cheeks. The hole is made in early infancy, and gradually enlarged by a series of "guides†." These "labrets," however, are not worn by the Eastern tribes. According to Richardson they are in use from Behring's Straits to the Mackenzie River‡. The other ornaments consist of strips of variously coloured fur, and fringes of pierced teeth, generally those of the fox or wolf. Among the Esquimaux visited by Captain Lyon, the ornaments were all appropriated by the men§. Some of the families are in the habit of tattooing themselves.

FIG. 220.

Esquimaux Cheek-stud.

* Parry, l. c. p. 495.

† Vancouver's Voyage, vol. ii. p. 280; see also p. 408; Belcher, l. c. p. 141.

‡ Arctic Expedition, vol. i. p. 355.

§ Lyon's Journal, p. 314.

The men hunt and fish. They make the weapons and implements, and prepare the woodwork of the boats. The women* are the cooks, prepare the skins, and make the clothes. They also repair the houses, tents, and boats, the men doing only carpenter's work. Though they do not appear to be very harshly treated, still the women have certainly "a hard and almost slavish life of it," although perhaps after all not more so than the men.

The Esquimaux are not altogether without music. They have a kind of drum, and sing both alone and in chorus. They are acquainted with several kinds of games†, both of strength and skill, and are fond of dances, which are often very indecent. One of their games resembled our cat's cradle‡, and Kane saw the children in Smith's Sound playing hockey on the ice. The Esquimaux have also a great natural ability for drawing. In many cases they have made rude maps for our officers, which have turned out to be substantially correct. Many of their bone implements are covered with sketches. Figs. 221 to 223 represent three bone drill-bows presented to the Ashmolean Muséum by Captain Beechey, and which I presume to be some of those which he obtained in Hotham Inlet, Kotzebue Sound, and described in his voyage to the Pacific. In fig. 223 we see yourts, or winter-houses, in two cases, with dogs standing on them. Men armed with bows and arrows, and others dragging seals home over the ice, and one man about to spear a reindeer with a movable-headed harpoon. In fig. 222 are reindeer, geese, a baidar, or flat-bottomed boat, a tent, round which various articles of clothing are hung up to dry, a woman, apparently engaged in the preparation of food, and a hunting-scene. A decoy, roughly representing the head and antlers of a reindeer, has been put up, and a

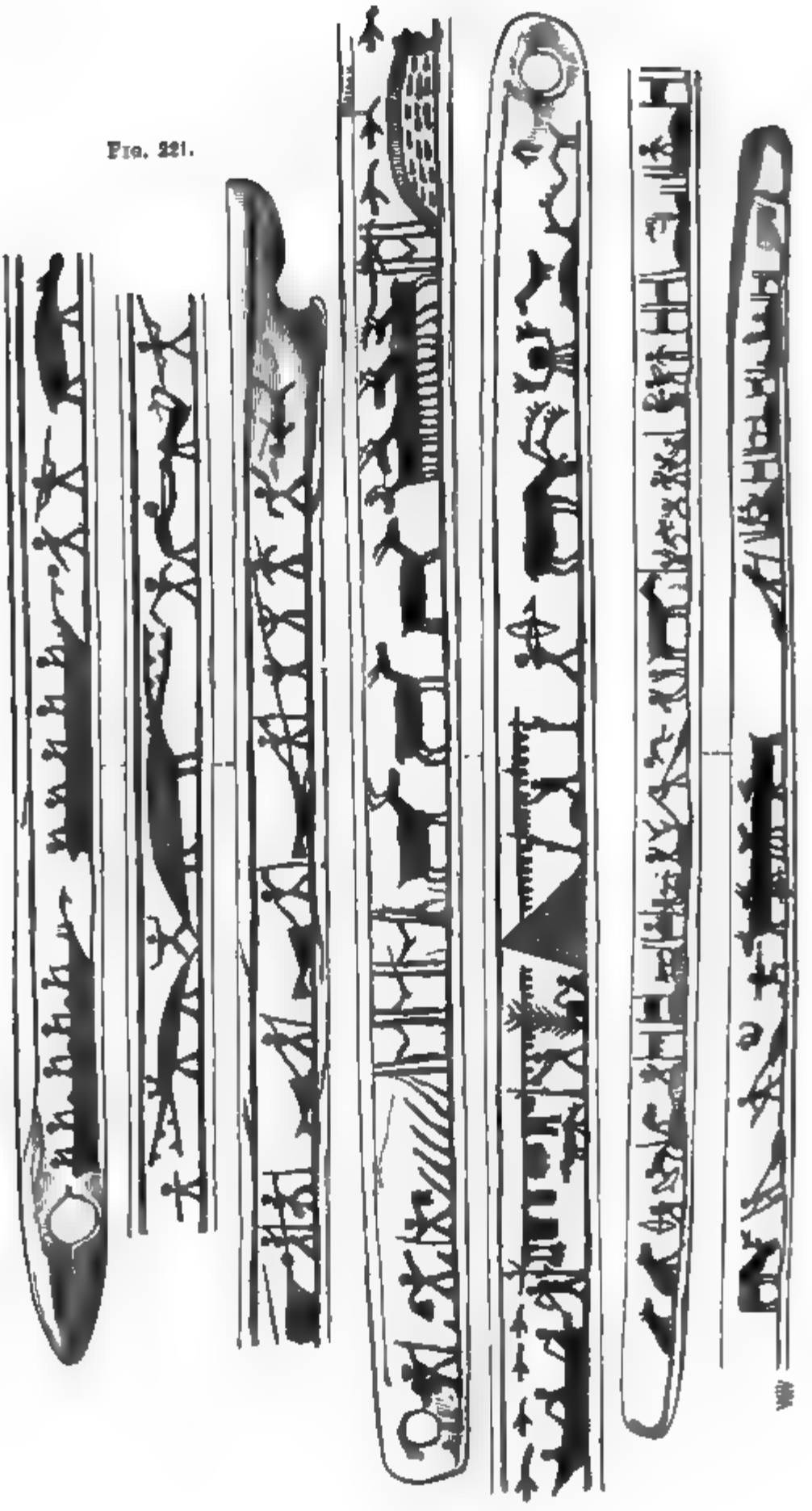
* Crantz, p. 164. † Egede, l. c. p. 162.

‡ Hall, l. c. vol. ii. p. 316.

Fig. 221.

Fig. 222.

Fig. 223.



real reindeer, while unsuspiciously browsing close by, is about to be shot by an Esquimaux hunter. In fig. 221 are represented two animals, apparently intended for crocodiles; the draughtsman must, I think, have seen drawings of this animal in some European vessel.

According to Crantz, the Greenland Esquimaux "have neither a religious nor idolatrous worship, nor so much as any ceremonies to be perceived tending towards it*." This statement has been confirmed by many other observers†. Their burial ceremonies have, however, been supposed to indicate a belief in the resurrection. They generally bend the body into a sitting posture, bringing the knees up under the chin, and then wrap the corpse in one of their best skins. For the grave they choose some high place, and over the corpse they make a heap of stones. Near the body some of them place the implements of the deceased, and even sometimes, if he was a man, his kajak; believing, as it has been said, that they will be of use to him in the new world. Egede‡, however, expressly denies that it is done with any such idea. This view is also confirmed by Hall, according to whom the Esquimaux have a superstitious objection to use, or even touch, any thing which has been in a house containing a dead body§. It is, perhaps, the same idea which induces them to remove a corpse, not through the ordinary entrance, but by way of the window‖. In other cases, when a person is evidently dying, they place by him every thing which can soothe and comfort his last moments, and then leave the igloo, or house, which they close up, thus converting it into a tomb¶. Crantz tells us that they "lay

* l. c. p. 197.

† Graah's Voyage to Greenland, p. 123; Ross, Baffin's Bay, vol. i. p. 175; Voyage of Discovery, p. 128; Parry, l. c. p. 551; Richardson's Arctic Expedition, vol. ii. p. 44; Egede, l. c. p. 183.

‡ l. c. p. 151.

§ l. c. vol. i. p. 201; vol. ii. p. 221.

‖ Graah, l. c. p. 128; Ross, Arctic Expedition, 1829–33, p. 290.

¶ Graah, l. c. p. 126.

a dog's head by the grave of a child, for the soul of a dog can find its way every where, and will show the ignorant babe the way to the land of souls," and this is admitted by Egede. Moreover, the custom of occasionally burying models of implements, instead of the implements themselves, tends to the same conclusion.

Captain Cook saw burial mounds of earth or stone at Oonalashka. One of the latter was near the village, and he observed that, in accordance with a custom which seems to prevail all over the world, every one who passed threw a stone on it*. Infants, if unfortunate enough to lose their mothers, are always buried with them; and sickly aged people are sometimes buried alive, as it is considered a kindness to spare them the pain of a lingering death. The Esquimaux observed by Captain Parry had a superstitious idea that any weight pressing upon the corpse would give pain to the deceased†. Such a belief would naturally give rise, in a more favoured country, to vaulted tumuli; but in the extreme north, the only result is that the dead bodies are but slightly covered up, in consequence of which the foxes and dogs frequently dig them up and eat them. This the natives regard with the utmost indifference; they leave the human bones lying about near the huts, among those of animals which have served for food; another reason for doubting whether their burial customs can be regarded as satisfactory evidence of any very definite and general belief in a resurrection, or whether the objects which they bury with their friends are really supposed to be of actual use to them. On the whole, the burial customs of the Esquimaux are curiously like those of which we find evidence in the ancient tumuli of northern and western Europe.

In character the Esquimaux are a quiet, peaceable people. Those observed by Ross in Baffin's Bay, "could not be made

* Voyage to the Pacific Ocean, vol. ii. p. 519. † l. c. pp. 395, 417, 550.

to understand what was meant by war, nor had they any warlike weapons*." Like other savages they resemble children in a great many respects. They are such bad arithmeticians that the "enumeration of ten is a labour, and of fifteen an impossibility with many of them†." Dr. Rae, whose partiality for the Esquimaux is well known, assures us that if a man is asked the number of his children, he is generally much puzzled. After counting some time on his fingers, he will probably consult his wife, and the two often differ, even though they may not have more than four or five‡.

Amongst the Esquimaux both polygamy and polyandry appear to occur. A strong or skilful man has often more than one wife, a beautiful or clever woman in some cases more than one husband§. Again, the temporary loan of a wife is considered a mark of peculiar friendship; in which, however, the advantage is not all on one side, as a large family, far from being any incumbrance, is among the Esquimaux a great advantage||. Apart, moreover, from these recognized customs, it does not appear that the Esquimaux set any very high value on the virtue of chastity.

They are excessively dirty. Considering the difficulty in obtaining enough water even to drink during the greater part of the year, we cannot, perhaps, wonder that they never dream of washing. Their word for dirt, *eberk*, conveys no idea of any thing disagreeable or offensive¶; but, in justice to them, we must remember that the extreme cold, by preventing putrefaction, removes one of our principal inducements to cleanliness, and at the same time induces so great a scarcity of liquid water, as to render washing almost an impossibility.

* l. c. p. 186.

† Parry, l. c. p. 251.

‡ See for a curious instance of this, Graah, l. c. p. 131.

§ Ross, l. c. p. 273.

|| Ross, l. c. p. 515.

¶ Kane, Arctic Explorations, vol. ii. p. 116.

As a general rule it is impossible to put any dependence on their promises, not so much that they are intentionally deceitful, as on account of the wavering and inconstant disposition which they possess in common with so many other savages. Among themselves a successful huntsman or fisherman is always ready to share his seal or walrus with his less fortunate neighbours; but he expects, as a matter of course, that a sufficient return will be made to him when an opportunity occurs. They give away nothing themselves without expecting to receive as much again, and, being unable to imagine any other line of conduct, are naturally very deficient in gratitude. Captain Ross, however, and Dr. Rae consider that the Esquimaux encountered by them were neither ungrateful nor particularly selfish. In other respects also these appear to have been very favourable specimens of the race. Though not cruel, the Esquimaux seem to be a somewhat heartless people. They do not, indeed, feel any actual pleasure in the infliction of pain, but they will take little trouble to remove or relieve suffering. They are also great thieves, but, as Captain Parry truly observes *, we must "make due allowance for the degree of temptation to which they were daily exposed, amidst the boundless stores of wealth which our ships appeared to them to furnish." According to Hall †, moreover, they are strictly honest among themselves, kind, generous, and trustworthy.

Parry thus describes them: "In the few opportunities we had of putting their hospitality to the test we had every reason to be pleased with them. Both as to food and accommodation the best they had were always at our service; and their attention, both in kind and degree, was every thing that hospitality and even good breeding could dictate. The kindly offices of drying and mending our clothes, cooking our provisions, and thawing snow for our drink, were per-

* l. c. p. 522.

† l. c. vol. ii. p. 312.

formed by the women with an obliging cheerfulness which we shall not easily forget, and which commanded its due share of our admiration and esteem. While thus their guest, I have passed an evening not only with comfort, but with extreme gratification; for, with the women working and singing, their husbands quietly mending their lines, the children playing before the door, and the pot boiling over the blaze of a cheerful lamp, one might well forget for the time that an Esquimaux hut was the scene of this domestic comfort and tranquillity; and I can safely affirm with Cartwright that, while thus lodged beneath their roof, I know no people whom I would more confidently trust, as respects either my person or my property, than the Esquimaux*."

Dr. Rae also has a very high opinion of them, and they seem from all accounts to present the remarkable phenomenon of a really high state of morality, without any thing which can be called religion.

The North American Indians.

The aboriginal, or at least the Pre-Columbian inhabitants of North America, fall naturally into three divisions. The Esquimaux in the extreme north, the Indian tribes in the centre, and the comparatively civilized Mexicans in the south. The central tribes, which occupied by far the greater extent of the continent, were again divided by the Rocky Mountains into two great groups; that on the western side being in much the most abject condition. Though no doubt there was and is an immense difference between different tribes—and particularly between the semi-agricultural nations of the west, and the filthy barbarians of Northern California—still as Mr. Schoolcraft, to whom we are indebted

* Parry's Three Voyages for the Discovery of a North-west Passage, vol. v. p. 13.

for an excellent work on the "History, Condition, and Prospects of the Indian Tribes*," truly says, "their manners and customs, their opinions and mental habits, had, wherever they were inquired into, at the earliest dates, much in common. Their modes of war and worship, hunting and amusements, were very similar. In the sacrifice of prisoners taken in war; in the laws of retaliation; in the sacred character attached to public transactions solemnized by smoking the pipe; in the adoption of persons taken in war, in families; in the exhibition of dances on almost every occasion that can enlist human sympathy; in the meagre and inartificial style of music; in the totemic tie that binds relationships together, and in the system of symbols and figures cut and marked on their grave-posts, on trees, and sometimes on rocks, there is a perfect identity of principles, arts, and opinions. The mere act of wandering and petty warfare kept them in a savage state, though they had the element of civilization with them in the Maize†."

As regards dress many of the Indian chiefs had magnificent dresses of skins and feathers. Some of the tribes, indeed, wore no clothes; but this was rarely the case with the women, and even the men had generally at least a loin cloth. The amount of clothing, however, depended very much on the temperature. In the plains and forests of the tropical and southern latitudes, "the Indian wears little or no clothing during a large part of the year;" but it is very different on the mountains and in the north, where the common dress was the breech-cloth and mocassins, with a buffalo-skin thrown over the shoulders. The inhabitants of Vancouver's Island had mats, made either of dog's-wool alone, of dog's-wool and goose-down together, or of threads obtained from cedar-bark. They often wore "necklaces or

* Published by authority of Congress. Philadelphia, 1853.

† l. c. vol. ii. p. 47.

shells, claws, or wampum; feathers on the head, and armlets, as well as ear and nose jewels*." Many of the Indian tribes are clean in their persons, and frequently use both the sweat-house and cold bath; others are described as repulsive in countenance and filthy both in person and habit.

The eastern tribes do not generally disfigure themselves artificially, except indeed by the use of paint; but it is very different in the west. The Sachet Indians of De Fuca's Straits wear pieces of bone or wood passed through the cartilage of the nose; the Classet Indians cut their noses when they capture a whale; among the Babines, who live north of Columbia River, the size of the under-lip is the standard of female beauty†. A hole is made in the under-lip of the infant, in which a small bone is inserted; from time to time the bone is replaced by a larger one, until at last a piece of wood three inches long and an inch and a half wide, is inserted in the orifice, which makes the lip protrude to a frightful extent. The process appears to be very painful.

Owing to the almost universal custom of fastening babies to a cradle-board, the American skulls are characterized by a flattened occiput. This peculiarity does not now occur in European heads, but it is found in many ancient skulls from various parts of the old continents, and indicates, as pointed out by Vesalius, Gosse, and Wilson, that the cradle-board, though long abandoned, was at one time used in Western Europe, as it is even now among the Indians of North America. The extraordinary practice of moulding the form of the head was common to several of the Indian tribes. It prevailed in Mexico and Peru, in the Carib Islands, and among the savage tribes of Oregon. Among the Natchez the deformity is described by the historian of De Soto's

* Schoolcraft, vol. iii. p. 65.

† Kane's Indians of North America, p. 242; Vancouver, l. c. vol. ii. pp. 280, 408.

expedition as consisting of an upward elongation of the cranium, until it terminated in a point or edge. The Choctaws, though enemies of the Natchez, "improved" their heads in the same way. Their children were placed upon a board, and a bag of sand was laid upon the forehead, "which, by continual gentle compressure, gives the forehead somewhat the form of a brick from the temples upwards, and by these means they have high and lofty foreheads sloping off backwards*." The Waxsaws, Muscogees or Creehs, Catawbas, and Altacapas are described as having had a similar custom. It was, however, only the male infants which were treated in this manner. Among the Nootka-Columbians the practice of flattening the head was universal. The child was placed in a box or cradle lined with moss. The occiput rested on a board at the upper part of the box, and another board was brought over the forehead, and tied firmly down on the head of the infant. The process continued until the child was able to walk, at which time it is described as presenting a most hideous appearance. The eyes "stand a prodigious way asunder," the eyeballs project very much, and are directed upwards, the head is very wide, and has almost the form of a wedge. The Newateos, a tribe residing on the north end of Vancouver's Island, forced the head into a conical shape, by means of a cord of deer-skin padded with the inner bark of the cedar tree. This cord, which is about as thick as a man's thumb, is wound round the infant's head and gradually forces it to take the shape of a tapering cone†. Among the Peruvians the forehead was pressed downwards and backwards by tight bandages, of which there seem to have been generally two, leaving a space between them, and thus producing a well-marked ridge running transversely across the

* Schoolcraft, l. c. vol. ii. p. 324.

† Wilson on Physical Ethnology, Smithsonian Report, 1832, p. 288.

skull. Thus, while the forehead was prevented from rising, and the sides of the head from expanding, the occipital region was allowed full freedom of growth, and the development of the brain was forced to take an unnatural direction. So great was the change produced, so extraordinary is the shape of these abnormal skulls, that many ethnologists have been disposed to regard them as belonging to a peculiar race. This theory, however, has been clearly proved to be erroneous, and is now universally abandoned. It is very remarkable that this unnatural process does not appear to have any prejudicial effect on the minds of the sufferers*.

Hearne states that the Northern Indians had no religion; even the celebrated "five nations" of Canada, according to Colden, had no religion, nor any word for God. Burnet† never found any semblance of worship among the Comanches. In the central parts of North America, however, the Indian tribes generally believed in the existence of a Great Spirit, and the survival of the soul, but they seem to have had scarcely any religious observances, still less any edifices for sacred purposes. The Dacotahs never pray to the Creator; if they wish for fine weather, they pray to the weather itself. They believe that the Great Spirit made all things except thunder and rice, but we are not told the reason for these two curious exceptions.

The social position of the women seems to have been very degraded among the aboriginal tribes of North America. "Their wives, or dogs, as some of the Indians term them," are indeed well treated as long as they do all the work, and there is plenty to eat; but throughout the continent, as indeed among all savages, the domestic drudgery falls to their lot, while the men hunt and make war; though in justice to

* Beecher's Voyage round the World, vol. i. p. 308; Wilson, Smithsonian Report, 1862, p. 287.

† Schoolcraft, vol. i. p. 237. See also Richardson's Arctic Expedition, vol. ii. p. 21.

thom we must remember that the former at least of these two occupations was of the greatest possible importance, and that upon it depended their principal means of subsistence. Polygamy generally prevailed; the husband had absolute power over his wives, and the marriage lasted only as long as he pleased. Among some of the North Californian Indians it is not thought right to beat the wives, but the men "allow themselves the privilege of shooting such as they tired of*." Among the Dogribs and other northern tribes, the women are the property of the strongest. Every one is considered to have both a legal and moral right to take the wife of any man weaker than he is. In fact, the men fight for the possession of the women, just like stags and the males of other wild beasts†. Lending wives is a frequent custom‡.

"Imperturbability§, in all situations, is one of the most striking and general traits of the Indian character. To still his muscles to resist the expression of all emotion, seems to be the point of attainment; and this is particularly observed on public occasions. Neither fear nor joy are permitted to break this trained equanimity." Even among relations "it is not customary to indulge in warm greetings. The pride and stoicism of the hunter and warrior forbid it. The pride of the wife, who has been made the creature of rough endurance, also forbids it."

But perhaps the most remarkable evidence of this is the fact that the Algonquin language, although one of the richest, contained no word for "to love," and when Elliott translated the Bible for them in 1661, he was obliged to coin one. He introduced the word "womon" to supply the

* Col. M'Kee in Schoolcraft's Indian Tribes, vol. iii. p. 127.

† See Hearne's Journey to the Copper-Mine River, p. 104.

‡ Hearne, l. c. p. 128; Carver's Travels, p. 131; James' Expedition to the Rocky Mountains, vol. i. p. 212.

§ Schoolcraft, vol. iii. p. 58.

want. Again, the Tinnè language* contains no word to express "dear" or "beloved." It is only fair to add that Kane found the Cree Indians *swearing* in French, having no oaths in their own language†. Mr. Schoolcraft records, as an indication that they are in reality of affectionate disposition, that he "once saw a Fox Indian on the banks of the Mississippi, near whose wigwam I had, unnoticed to him, wandered, take up his male infant in his arms, and several times kiss it‡." The special mention of this fact conveys a different impression from that which was intended. Nevertheless, among the better tribes many no doubt are capable of feeling strong affection, and there are even cases on record in which the father has redeemed his son from the stake, and actually been burnt in his stead.

Partly no doubt from the hatred produced by almost incessant wars, partly perhaps encouraged by the stoical disregard of pain which it was their pride to affect, the North American Indians were very cruel to captives taken in war. Scalping seems to have been an universal practice, and it is even said that the Sioux sometimes ate the hearts of their enemies, every one of the war-party getting a mouthful, if possible.

Infanticide was common in the north, but does not seem to have prevailed among the southern tribes to any great extent; and until the advent of Europeans they do not appear to have had any fermented liquors. The Sioux, Assiniboines, and other tribes on the Missouri are said to have habitually abandoned those who from age or infirmities were unable to follow the hunting-camps. The same was frequently the case among the northern tribes.

Copper is found native in the northern districts, and even before the advent of the Europeans was used for hatchets,

* Richardson's Arctic Expedition, vol. ii. p. 24. † l. c. p. 339.
‡ l. c. vol. iii. p. 64.

bracelets, etc. Nevertheless, it was used rather as a stone than as a metal; that is to say, the Indians did not heat it and run it into moulds, or work it when hot, but simply took advantage of its malleability and hammered it into form, without the assistance of heat. Metallic vessels were quite unknown to the aborigines of North America.

The implements of the Shoshonees, or Snake Indians, are described by Wyeth. Their possessions were confined to "the pot, bow and arrow, knives, graining tools, awls, root-digger, fish-spears, nets, a kind of boat or raft, the pipe, mats for shelter, and implements to produce fire *."

The pot was made of "long tough roots, wound in plies around a centre, shortening the circumference of the outer plies so as to form a vessel in the shape of an inverted bee-hive." They were so well made as to be quite water-tight, and though of course they could not be put on the fire, still they were used for boiling, in the manner already described as practised by other savages. The Dacotahs are said to have sometimes boiled animals in their own skins, taking the skin off whole, suspending it at the four corners, and making use of boiling stones as usual. They had also stone vessels, but these were rare, and probably used only as mortars.

Their bows are very skilfully made of the horns of the mountain sheep and elk, or sometimes of wood. "The string is of twisted sinew, and is used loose, and those using this bow require a guard to protect the hand which holds it." The arrow is driven with such force that it will pass right through the body of a horse or buffalo†, and in the account of De Soto's expedition, it is stated that on one occasion an arrow went through the saddle and housings of a horse and penetrated one-third of its length into the body. Although

* Schoolcraft, vol. i. p. 212.

† Schoolcraft, l. c. vol. iii. pp. 35, 46; Kane's North American Indians, p. 141; Catlin, l. c. vol. i. p. 31; vol. ii. p. 212; McKean and Hall's Indian Tribes, vol. ii. p. 4.

on the whole far inferior to the rifle, still in hunting, the bow has the one great advantage of silence. Among several of the tribes, arrow-making was a distinct profession. The arrow-heads are of obsidian, about three-fourths of an inch long and half an inch wide, and quite thin. The base is expanded and is inserted into the split end of the shaft, being kept in its place by sinews. The shaft is about two feet and a half long; when intended for hunting it is expanded at the end, so that when it is drawn out of the wound the arrow-head is extracted also; but the shafts of war-arrows taper to the end, so that when they are drawn out the head remains behind. The sling does not appear to have been much used.

The knives are rudely made of obsidian, and are sometimes fastened in handles of wood or horn. The graining tools for preparing skins are sometimes of bone, sometimes of obsidian. Mr. Wyeth does not describe their form. Awls were made of bone; large thorns also being sometimes used for the purpose. Root-diggers are either made of horns, or of crooked sticks pointed and hardened by fire. "The fish-spear is a very simple and ingenious implement. The head is of bone, to which a small strong line is attached near the middle, connecting it with the shaft about two feet from the point. Near the forward end of this head there is a small hole, which enters it ranging acutely towards the point of the head; it is quite shallow. In this hole the front end of the shaft is placed." The shaft is of light willow, and about ten feet long. When the fish is struck, the shaft is withdrawn, and the string at once pulls the bone end into a transverse position. The fish-nets are made of bark, which gives a very strong line, and are of two kinds, the scoop and the seine. They are, however, unknown among the northern tribes west of the Mackenzie*. The boats of the Shoshonees hardly deserve the name, and seem to be used only for cross-

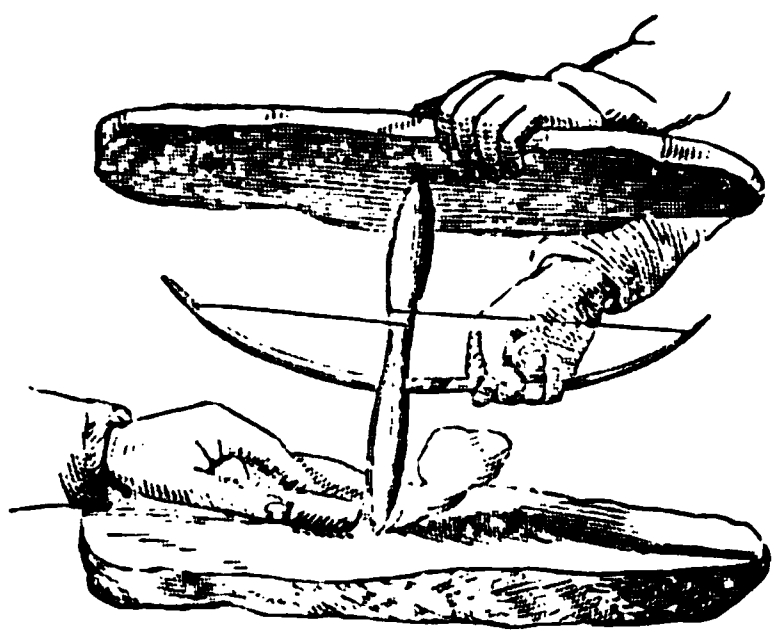
* Richardson's Arctic Expedition, vol. ii. p. 25.

ing rivers. They are about eight feet long, and made of reeds, but there is no attempt to make them water-tight. Other tribes, however, have much better canoes, made either of bark or of a log hollowed out. The pipes are large, and the bowl is generally of fuller's earth, or of soap-stone. The mats are about four feet long, are made of rushes, and are used either as beds, or in the construction of wigwams.

They obtain fire by rubbing a piece of wood in a hole. The Chippeways and Natchez tribes had an institution for keeping up a perpetual fire, certain persons being set aside and devoted to this occupation.

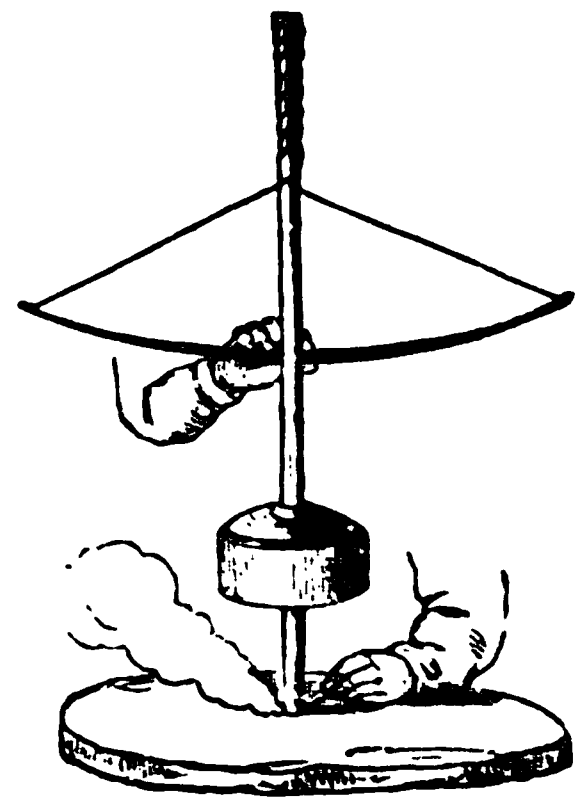
The Dacotahs used a drill bow (fig. 224) for the purpose of obtaining fire. This instrument, as shown in the accompanying figure, is a small stiff bow, the string of which forms a loop round the upright stick, and thus, when the bow is moved backwards and forwards, gives it a rotatory movement. The Iroquois had effected a still further improvement, and worked with an instrument (fig. 225) closely resembling that used in Western Europe, and also in Ceylon*, to drill holes in earthenware and metal.

FIG. 224.



Dacotah Fire Drill Bow.

FIG. 225.



Iroquois Fire Pump Drill.

* Davy's Ceylon, p. 263.

The huts or wigwams of the North American Indians are of two kinds, one for summer, and the other for winter. The winter wigwam of the Dacotahs is thus described by Schoolcraft: "To erect one of them it is only necessary to cut a few saplings about fifteen feet in length, place the large ends on the ground in a circle, letting the tops meet, thus forming a cone. The buffalo-skins, sewed together in the form of a cap, are then thrown over them and fastened together with a few splints. The fire is made on the ground in the centre of the wigwam, and the smoke escapes through an aperture at the top. These wigwams are warm and comfortable. The other kind of hut is made of bark, usually that of the elm*." The huts of the Mandans †, Minatarees, etc., were circular in form, and from forty to sixty feet in diameter. The earth was removed to a depth of about two feet. The framework was of timber, covered with willow boughs, but leaving a space in the middle to serve both as chimney and window. Over the woodwork was placed a thick layer of earth, and at the top of all some tough clay, which was impervious to water, and in time became quite hard, as in fine weather the tops of the huts were the common lounging place for the whole tribe. Though these dwellings were sometimes kept very clean and tidy ‡, this was not always the case. Speaking of the Nootka Sound Indians, Captain Cook § says: "The nastiness and stench of their houses are, however, at least equal to the confusion. For, as they dry their fish within doors, they also gut them there, which, with their bones and fragments thrown down at meals, and the addition of other sorts of filth, lie every where in heaps, and are, I believe, never carried away till it

* l. c. vol. ii. p. 191.

† This tribe, one of the most interesting, has been entirely swept away by the small-pox.

‡ Catlin's American Indians, vol. i. p. 82.

§ Third Voyage, vol. ii. p. 316.

becomes troublesome, from their size, to walk over them. In a word, their houses are as filthy as hog-sties: every thing in and about them stinking of fish, train-oil, and smoke."

The Wallawalla Indians* of Columbia dig a circular hole in the ground about ten or twelve feet deep, and from forty to fifty feet in circumference, and cover it over with drift-wood and mud. A hole is left on one side for a door, and a notched pole serves as a ladder (see fig. 141, p. 132). Here twelve or fifteen persons burrow through the winter, requiring very little fire, as they generally eat their salmon raw, and the place is warm from the numbers collected together and the absence of ventilation. In summer they use lodges made of rushes or mats spread on poles. This tribe lives principally on salmon, preferring it putrid.

South of the Gulf of St. Lawrence and west of the Rocky Mountains almost all the tribes seem to have grown more or less maize. In the Carolinas and Virginia the Indians raised large quantities, and "all relied on it as one of their fixed means of subsistence†." The Delawares had extensive maize fields at the time of the discovery of America. In 1527, De Vaca saw it in small quantities in Florida, and De Soto, twelve years later, found it abundant among the Muscogees, Choctaws, Chickasaws, and Cherokees. On one occasion his army marched through fields of it for a distance of two leagues. It is known to have been cultivated by the Iroquois in 1610, and, though only in small quantities, "by the hunter communities of the Ohio, the Wabagh, the Miami, and the Illinois," as well as by the natives along both banks of the Mississippi. The evidences of ancient agriculture have been already alluded to in the chapter on North American Archæ-

* Kane's North American Indians, p. 272; United States' Exploring Expedition, vol. iv. p. 452.

† Schoolcraft, l. c. vol. i. p. 6. See also Richardson's Arctic Expedition, vol. ii. p. 51.

ology; the maize appears to have been the only plant actually under cultivation; but some of the tribes depended for their subsistence very much on roots, etc. The principal implement of agriculture seems to have been the hoe, for which they often used the shoulder-blade of the bison fixed into a handle of wood. Wild rice also grew abundantly in the shallow lakes and streams of Michigan, Wisconsin, Iowa, Minnesota, as well as in the upper valleys of the Mississippi and Missouri. It was gathered by the women, and formed one of their principal articles of food. They went into the rice-fields in canoes, and bending the stalks in handfuls over the sides of the canoe, beat out the grain with paddles.

The North American Indians, however, depended mainly on the animal kingdom for their subsistence. They are essentially hunters and fishermen; the buffalo, the deer, and the salmon supplying them with their principal articles of food. The buffaloes were sometimes driven into pounds, sometimes shot on the open prairie with bows and arrows. Fish were speared, caught in weirs, etc., or shot with the bow. The Macaws and Clallums on the Pacific coast sometimes even killed whales. For this purpose they use large barbed harpoons of bone, with a string, and a strong seal-skin bag filled with air. This apparatus was used in the same manner as among the Esquimaux (*ante*, p. 503). Like all carnivorous animals, the Indians alternate between seasons of great plenty and extreme want. Usually game is abundant, and Noka, one of their most celebrated hunters, is said to have killed in one day sixteen elks, four buffaloes, five deer, three bears, one porcupine, and one lynx. This of course was a very exceptional case. Still there is generally some season of the year when they kill more game than is required for immediate consumption. In this case the surplus is dried and made into pemmican. In winter, however, they are often very short of provisions. Back gives a

terrible picture of their sufferings in famine times*; and Wyeth tells us that the Shoshonees "nearly starve to death annually, and in winter and spring are emaciated to the last degree; the trappers used to think they all eventually died from starvation, as they became old and feeble †."

As might naturally be expected, the mode of burial varies much in different parts of North America. In Columbia and among many of the Prairie tribes, the dead are generally sewn up in a skin or blanket and placed either on the boughs of a tree or on a scaffold; the personal property of each deceased individual being placed near the body ‡." In some cases the bodies were placed in canoes, and deposited among the branches of trees. Many of the Eastern races, as already mentioned (*ante*, p. 130), buried their dead under tumuli. Among the Clear Lake Indians, the Carriers, etc., it was usual to burn them, while in Florida they were interred in a sitting posture. Among other tribes the bones of the dead were collected every eight or ten years, and laid in one common burial place.

The Redskins are not altogether deficient in art, being able to make rude carvings, and to trace equally rude drawings on their wigwams, robes, etc.; but about portraits they have some curious ideas. They think that an artist acquires some mysterious power over any one whose likeness he may have taken; and on one occasion, when annoyed by some Indians, Mr. Kane got rid of them at once by threatening to draw any one who remained. Not one ventured to do so. If the likeness is good, so much the worse—it is, they fancy, half alive,—at the expense of the sitter. So much life, they argue, could only be put in the picture by taking it away from the original. Again, they fancy that if the picture were

* Arctic Land Expedition, p. 194 to 226. See also Richardson's Arctic Expedition, vol. ii. p. 96.

† Schoolcraft, vol. i. p. 216.

‡ United States' Exploring Expedition, vol. iv. p. 389.

injured, by some mysterious connexion the original would suffer also. But perhaps the oddest notion of all is recorded by Catlin. He excited great commotion among the Sioux by drawing one of their great chiefs in profile. "Why was half his face left out," they asked; "Mahtocheega was never ashamed to look a white man in the face." Mahtocheega himself does not seem to have taken any offence, but Shonka, The Dog, took advantage of the idea to taunt him. "The Englishman knows," he said, "that you are but *half a man;* he has painted but one half of your face, and knows that the rest is good for nothing." This view of the case led to a fight, in which poor Mahtocheega was shot; and as ill-luck would have it, the bullet by which he was killed tore away just that part of the face which had been omitted in the drawing. This was very unfortunate for Mr. Catlin, who had great difficulty in making his escape, and lived some months after in fear for his life; nor was the matter settled until both Shonka and his brother had been killed in revenge for the death of Mahtocheega.

Like so many other savage races the North Americans are rapidly disappearing. Left to themselves they would perhaps have developed an indigenous civilization, but for ours they are unfit. Unable to compete with Europeans as equals, and too proud to work as inferiors, they have profited by intercourse with the superior race only where the paternal government of the Hudson's Bay Company has protected them both from the settlers and from themselves, has encouraged hunting, put an end to war, prevented the sale of spirits, and, in times of scarcity, provided food. Ere long the only remains of the Indian blood will, perhaps, be found in the territories of the Hudson's Bay Company.

The Paraguay Indians.

The Indians of Paraguay have been described by Dobritzhoffer* and by Don Félix de Azara†, who lived a long time among them. He found them divided into several different nations or tribes, with at least forty distinct languages, and with different customs. Some of them lived by fishing, but the greater number depended for their subsistence on the wild horses and cattle, and must therefore have had different habits before the discovery of America by the Europeans. Their principal arms were long spears, clubs, and bows and arrows. Some tribes, however, as, for instance, those of the Pampas, do not use bows and arrows, but prefer the bolas. In war, the Indians of Paraguay gave no quarter to men, but spared only the women and children.

Their houses, if we can call them so, were of the simplest character; they cut three or four boughs, stuck the two ends into the ground, and threw over them a cow-skin. Their bed consisted of another skin; they had no chairs or tables, or any kind of furniture. The men seldom wore any clothes; the dress of the women consisted usually of a poncho, although among some of the tribes, as the Nalicuégas, even this was dispensed with. The art of washing seems to have been entirely unknown, though Azara admits that in very hot weather they used sometimes to bathe, rather, however, as it would appear, for coolness, than for cleanliness. It is unnecessary therefore to say that they were excessively filthy. They had no domestic animals, nor any idea of agriculture. Their doctors had but one remedy, which they applied in all cases, and which had at least the great merit of being harm-

* Dobritzhoffer, History of the Abipones.

† Voyages dans l'Amérique Méridionale, 1809.

less—since it consisted "à sucer avec beaucoup de force l'estomac du patient, pour en tirer le mal*."

Many of the tribes painted their bodies in various ways, and it was usual to pierce the under-lip and insert a piece of wood, about four or five inches long, which they never removed.

They had no established form of government, nor, according to Azara, any ideas of religion. He makes this latter statement generally for all the Indians, and repeats it particularly for the following tribes—namely, the Charruas, Minuanas, Aucas, Guaranys, Guayanas, Nalicuégas, Guasarapos, Guatos, Ninaquiguilas, Guanas, Lenguas, Aguilots, Mocobys, Abipones, and Paraguas; yet it appears from other passages that some at least of these tribes were believers in witchcraft and in mysterious evil beings.

Azara describes the language of the Guaranys as being the most copious, and yet it was in many respects very deficient; for instance, they could only count up to four, and had no words for the higher numbers, not even for five or six. It is quite unnecessary to say that the marriage tie was little regarded among them; they married when they liked, and separated again when they pleased.

Infanticide was, in several of the tribes, the rule, rather than the exception; the women brought up but one child each, and as they spared only the one which they thought likely to be the last, it often happened that they were left without any at all.

The Patagonians.

The inhabitants of the southern parts of South America, although they are divided into numerous different tribes,

* Azara, l. c. p. 25. Dobritzhoffer's History of the Abipones, vol. ii. p. 251.

may be considered as falling into two great groups: the Patagonians, or Horse Indians on the East, who have horses but no canoes; and the Chonos and Fuegians, or Canoe Indians, who have canoes, but no horses, and who inhabit the tempestuous islands on the south and west.

The Yacana-kunny who inhabit the north eastern part of Tierra del Fuego, are, properly speaking, not Fuegians, but Patagonians, and resemble them in colour, stature, and clothing, except the peculiar boots. They live now pretty much as the main-landers probably did before the introduction of horses, and feed principally on guanacoes, ostriches, birds, and seals, which they kill with dogs, bows and arrows, bolas, slings, lances and clubs*. The habits of the Patagonians must have been much altered by the introduction of the horse, but we can only deal with them as they now are.

The Horse and Canoe Indians offer a great contrast in point of size; while the latter are short, ill-looking, and badly proportioned, the former are considerably above the average height, and are described by early travellers as being truly gigantic. They were first visited in 1519 by Magellan, who assures us that many of them were above seven feet (French) in height. In 1525 they were seen by Garcia de Loaisa, who mentions their great stature, but does not seem to have measured them. Similar statements were made by Cavendish, Knevett, Sibald de Veert, Van Noort, Spilbergen, and Lemaire; in fact, out of the fifteen first voyagers who passed through the Magellanic Straits, not fewer than nine attest the fact of the gigantic size of the Patagonians; in which they are confirmed by the testimony of several subsequent travellers, and especially of Falkner, who assures us that he saw many men who were over seven feet in height.

It is difficult altogether to reject these statements, and as

* Fitzroy, l. c. vol. ii. p. 137.

they are certainly not applicable to the present race, it is possible that there may have been a change of size owing to the introduction and general use of the horse.

The huts, or "toldos," of the Patagonians, are "rectangular in form, about ten or twelve feet long, ten deep, seven feet high in front, and six feet in the rear. The frame of the building is formed by poles stuck in the ground, having forked tops to hold cross pieces, on which are laid poles for rafters, to support the covering, which is made of skins of animals sewn together, so as to be almost impervious to rain or wind. The posts and rafters, which are not easily procured, are carried from place to place in all their travelling excursions. Having reached their bivouac, and marked out a place with due regard to shelter from the wind, they dig holes with a piece of pointed hard wood, to receive the posts: and all the frame and cover being ready it takes but a short time to erect a dwelling*."

They have no pottery, and for carrying water the only vessels they use are bladders. Their dress consists principally of skins, sewn together with ostrich sinews, and often curiously painted on one side; but, according to Falkner†, some of the tribes "make or weave fine mantles of woollen yarn, beautifully dyed with many colours. They have also a small triangular apron, two corners of which are tied round the waist, while the third passes between the legs and is fastened behind. When on horseback they use a kind of poncho or mantle, with a slit in the middle, through which they put their head. For boots they wear the "skin of the thighs and legs of mares and colts;" they clean the skins, and then, after drying, soften with grease, and so put them on without either shaping or sewing‡. They make

* Fitzroy, l. c. vol. i. p. 93.

† Falkner's Patagonia, p. 128.

‡ When first visited they used the skin of the guanaco for this purpose, and it was on account of these shoes that Magellan called them "Patagonians."

brushes of grass, twigs, and rushes, and use the jaw of a porpoise for a comb*. The women wear a mantle, fastened across the breast by a wooden skewer, or pin, and tied round the waist. They have also a kind of apron which reaches down to their knees, but which only covers them in front. Their boots are made in the same way as those of the men. Like other savages, they are fond of beads, feathers, and other ornaments. They also paint themselves with red, black, and white, which, however, to European eyes is any thing but an improvement. Their defensive armour consists of a helmet and a shield, both made of thick hide, and strong enough to resist either arrows or lances.

Their bows are small, and the arrows, which are pointed with stone or bone, are said to be sometimes poisoned. They have also clubs and long cane lances, most of which are now tipped with iron. But the weapons which are most characteristic of the Patagonians, and which are indeed almost peculiar to them, are the bolas†, of which there are two or three sorts. That used in war is a single rounded stone or ball of hardened clay, weighing about a pound, and fastened to a short rope or sinew of skin. This they sometimes throw at their adversary, rope and all, but generally they prefer to strike at his head with it. For hunting they use two similar stones fastened together by a rope, which is generally three or four yards long. One of the stones they take in their hand, and then whirling the other round their head, throw both at the object they wish to entangle. Sometimes several balls are used, but two appear to be the usual number. They do not try to strike their victim with the balls themselves, but with the rope, "and then of course the balls swing round in different directions and the thongs become so 'laid up,' or twisted, that struggling only makes the captive

* Fitzroy, vol. i. p. 75.

† Falkner, l. c. p. 130.

more secure*." It is said that a man on horseback can use the "bolas" effectually at a distance of eighty yards†. They also use the lasso.

On the coast their food consists principally of fish, which they kill either by diving or striking them with their darts. Guanacoes and ostriches they catch with the bolas, and they also eat mare's flesh, as well as various sorts of small game, and at least two kinds of wild roots. They have no fermented liquor, and the only prepared drink which they use is a decoction of chālăs, and the juice of berberries mixed with water.

The death of a native is attended with peculiar ceremonies. The bones having been as much as possible freed from the flesh, are hung "on high, upon canes or twigs woven together, to dry and whiten with the sun and rain." One of the most distinguished women is chosen to perform the disgusting office of making the skeleton, and, during the process, "the Indians, covered with long mantles of skins, and their faces blackened by soot, walk round the tent with long poles or lances in their hands, singing in a mournful tone of voice and striking the ground, to frighten away the Valichus or evil beings. . . . . The horses of the dead are killed that he may have wherewithal to ride upon in the Alhue Mapu, or Country of the Dead." In about a year the bones are "packed together in a hide, and placed upon one of the deceased's favourite horses, kept alive for that purpose," and in this manner the natives bear the relics, sometimes to a very great distance, until they arrive at the proper burial place, where the ancestors of the dead man are lying. The bones are arranged in their proper positions, and fastened by string. The skeleton is then placed, with others, in a square pit, clothed in the best robes, and adorned with beads, feathers, etc. The arms of the deceased are buried with him,

* Fitzroy, l. c. vol. ii. p. 148. † Darwin's Journal, p. 129.

and round the grave are ranged several dead horses, raised on their feet, and supported with sticks*. Sometimes a cairn of stones is raised over the grave†.

Falkner regarded the Patagonians as Polytheists, but we do not know much about their religion. According to the missionaries, neither the Patagonians nor the Araucanians had any ideas of prayer, or "any vestige of religious worship‡."

The Fuegians.

The inhabitants of Tierra del Fuego are even more degraded than those of the main-land: in fact, they have been regarded by many travellers as being the lowest of mankind§. Adolph Decker, who visited Polynesia and Australasia under Jaques le Hermite in 1624, describes them as "rather beasts than men; for they tear human bodies to pieces, and eat the flesh raw and bloody as it is. There is not the least spark of religion or policy to be observed among them: on the contrary, they are in every respect brutal"—of which he proceeds to give evidence so convincing, that I refrain from quoting it||. The men go altogether naked, and the women have only a bit of skin about their middles; . . . . . Their huts are made of trees, in the shape of tents with a hole at the top to let out the smoke. Within they are sunk two or three feet under the earth; and the mould is thrown upon the outside. Their fishing-tackle is very curious, and their stone hooks very nearly the same shape as ours. They are differently armed, some having bows, and arrows headed with stone; others have long javelins, pointed with bone; some again have great wooden clubs; and some have slings,

* Falkner's Patagonia, pp. 118, 119.

† Fitzroy, vol. ii. p. 158.

‡ The Voice of Pity, vol. ii. pp. 37, 95.

§ Byron's Voyage round the World, p. 80; Wallis's Voyage round the World, p. 392; Cook's Voyage to the South Pole, vol. ii. p. 187; Darwin's Journal, p. 235.

|| Callander's Voyages, vol. ii. p. 307.

with stone-knives, which are very sharp." Their arrows are of hard wood, straight and well polished. They are about two feet long, and are tipped with a piece of agate, obsidian, or glass; the head not being fixed to the shaft, remains in the wound, even when the arrow is drawn out. The bows are from three to four feet long, and quite plain. The string is made of twisted sinews.

Forster* found them "remarkably stupid, being incapable of understanding any of our signs, which, however, were very intelligible to the nations of the South Sea." Wallis, in his "Voyage round the World†," describes them as follows: "They were covered with seal-skins, which stunk abominably, and some of them were eating the rotten flesh and blubber raw, with a keen appetite and great seeming satisfaction." And again he says, "Some of our people, who were fishing with a hook and line, gave one of them a fish, somewhat bigger than a herring, alive, just as it came out of the water. The Indian took it hastily, as a dog would take a bone, and instantly killed it, by giving it a bite near the gills: he then proceeded to eat it, beginning with the head, and going on to the tail, without rejecting either the bones, fins, scales, or entrails‡." Their cookery is, if possible, still more disgusting. Fitzroy tells us that it was "too offensive" for description; and the account given by Byron§ entirely confirms this statement.

The men, says Fitzroy||, "are low in stature, ill-looking, and badly proportioned. Their colour is that of very old mahogany—or rather between dark copper and bronze. The trunk of the body is large, in proportion to their cramped and rather crooked limbs. Their rough, coarse, and extremely

* l. c. p. 251.

† Hawkesworth's Voyages, l. c. p. 403.

‡ l. c. p. 403.

§ Byron's Loss of the "Wager," p. 132.

|| Voyages of the "Adventure" and "Beagle," vol. ii. p. 137.

dirty black hair half hides, yet heightens, a villanous expression of the worst description of savage features. The hair of the women is longer, less coarse, and certainly cleaner than that of the men. It is combed with the jaw of a porpoise, but neither plaited nor tied; and none is cut away, excepting from over their eyes. They are short, with bodies largely out of proportion to their height; their features, especially those of the old, are scarcely less disagreeable than the repulsive ones of the men. About four feet and some inches is the stature of these she-Fuegians—by courtesy called women. They never walk upright; a stooping posture, and awkward movement is their natural gait. They may be fit mates for such uncouth men, but to civilized people their appearance is disgusting. . . . . .
The smoke of wood fires, confined in small wigwams, hurts their eyes so much, that they are red and watery: the effects of their oiling or greasing themselves, and then rubbing ochre, clay, or charcoal over their bodies; of their often feeding upon the most offensive substances, sometimes in a state of putridity; and of other vile habits, may readily be imagined*." Their incisors are worn flat†, like those of the Esquimaux and of many ancient races.

"The men procure food of the larger kind, such as seal, otter, porpoise, etc.; they break or cut wood and bark for fuel, as well as for building the wigwams or canoes. They go out at night to get birds; they train the dogs, and of course undertake all hunting or warlike excursions. The women nurse their children, attend the fire (feeding it with dead wood rather than green, on account of the smoke), make baskets and water-buckets, fishing-lines and necklaces, go out to catch small fish in their canoes, gather shell-fish, dive for sea-eggs, take care of their canoes, upon ordinary

* l. c. p. 139.

† Fitzroy, Appendix, p. 144.

occasions paddle their masters about while they sit idle, and do any other drudgery*."

"Swimming is a favourite amusement of the Fuegians during summer; but the unfortunate women are obliged to go out into rather deep water, and dive for sea-eggs in the depth of winter as often as in summer. Men, women, and children are excellent swimmers, but they all swim like dogs."

"When there is time, the natives roast their shell-fish, and half-roast any other food that is of a solid nature; but when in haste, they eat fish, as well as meat, in a raw state. . . . . Both seal and porpoises are speared by them from their canoes. When struck, the fish usually run into the kelp, with the spear floating on the water, being attached by a short line to a movable barb: and then the men follow with their canoe, seize the spear, and tow by it till the fish is dead. To them the taking of a seal or a porpoise is a matter of as much consequence as the capture of a whale is to our countrymen. On moonlight nights, birds are caught when roosting, not only by the men, but by their dogs, which are sent out to seize them while asleep upon the rocks or beach: and so well are these dogs trained that they bring all they catch safely to their masters, without making any noise, and then return for another mouthful. Birds are also frequently killed with arrows or by stones slung at them with unerring aim. Eggs are largely sought for by the natives; indeed I may say that they eat any thing and every thing that is eatable, without being particular as to its state of freshness, or as to its having been near the fire†."

According to Byron the dogs of the Chonos Indians assist in killing fish as well as birds. They are, he says, "cur-like looking animals, but very sagacious, and easily trained to

* Fitzroy, l. c. p. 185. † Fitzroy, l. c. p. 184.

this business. . . . . The net is held by two Indians, who get into the water; then the dogs, taking a large compass, dive after the fish, and drive them into the net; but it is only in particular places that the fish are taken in this manner." He adds that the dogs, "enjoy it much, and express their eagerness by barking every time they raise their heads above the water to breathe*."

Fig. 226.

Bone Harpoon.

"In the winter, when the snow lies deep, the Tekeenica people assemble to hunt the guanaco, which then comes down from the high lands to seek for pasture near the sea. The long legs of the animal stick deeply into the snow and soft boggy ground, disabling him from escape, while the Fuegians and their dogs hem him in on every side, and quickly make him their prey. . . . . At other times of the year they sometimes get them by lying in wait, and shooting them with arrows, or by getting into a tree near their track, and spearing them as they pass beneath the branches. An arrow was shown to Low, which was marked with blood two-thirds of its length in wounding a guanaco, afterwards caught by dogs. Low held out his jacket, making signs that the arrow would not penetrate it; upon which the native pointed to his eye†." Fig. 226 represents the head of a Fuegian harpoon, which closely resembles the ancient Danish specimen figured in p. 105.

Of vegetable food they have very little: a few berries, cranberries, those which grow on the arbutus, and a kind of fungus which is found on the beech, being the only sorts used. The wretched

* Byron's Loss of the "Wager." In Kerr's Voyages and Travels, vol. xvii. pp. 339, 368, 463.

† Fitzroy, l. c. p. 187.

Fuegians often suffer greatly from famine. On one occasion when the Chonos were in great distress on this account, a small party went away, and the natives said that in four sleeps they would return with food. On the fifth day they came back almost dead with fatigue, and "each man having two or three great pieces of whale-blubber, shaped like a poncho with a hole in the middle, on his shoulders. The blubber was half putrid, and looked as if it had been buried underground." Notwithstanding this, it was cut into slices, broiled, and eaten. On another occasion masses of blubber were found in sand, doubtless laid in store for a season of want. Their principal food, however, consists of limpets, mussels, and other shell-fish.

Admiral Fitzroy entertains no doubt that the Fuegians are cannibals. "Almost* always at war with adjoining tribes, they seldom meet but a hostile encounter is the result; and then those who are vanquished and taken, if not already dead, are killed and eaten by the conquerors. The arms and breast are eaten by the women; the men eat the legs, and the trunk is thrown into the sea." Again, in severe winters, when they can obtain no other food, they take "the oldest woman of their party, hold her head over a thick smoke, made by burning green wood, and pinching her throat, choke her. They then devour every particle of the flesh, not excepting the trunk, as in the former case." When asked why they did not rather kill their dogs, they said, "Dog catch iappo," i. e. otters.

Like Decker, Admiral Fitzroy "never witnessed or heard of any act of a decidedly religious nature†." Still some of the natives suppose that there is a powerful and mysterious being who resides in the woods. When a person dies, they

* l. c. p. 183.

† See also Weddell, Voyage to South Pole, p. 179; The Voice of Pity, vol. vi. p. 92, &c.

carry the body far into the woods *, "place it upon some broken boughs, or pieces of solid wood, and then pile a great quantity of branches over the corpse."

Their canoes are large pieces of bark sewn together. In the bottom they make a fireplace of clay, for they always keep fires alight, though with the help of iron pyrites they soon obtain sparks if any accident happens. The Chonos Indians, who in most respects resemble the Fuegians, have much better canoes. These are formed of planks, which are generally five in number, two on each side and one at the bottom. Along the edges of each are small holes about an inch apart. The planks are sewn together with woodbine, the holes being filled with a kind of bark beaten up until it resembles oakum. Byron truly observes that in the absence of metal, "the labour must be great of hacking a single plank out of a large tree with shells and flints, even though with the help of fire."

The Fuegians have no pottery, but like the North American Indians use vessels made of birch, or rather of beech-bark. On the east coast many of the natives possess guanaco-skins, and on the west some of them wear seal-skins. "Amongst the central tribes the men generally possess an otter-skin, or some small scrap about as large as a pocket-handkerchief, which is barely sufficient to cover their backs as low down as their loins. It is laced across the breast by strings, and according as the wind blows, it is shifted from side to side †." Many, however, even of the women, go absolutely without clothes. Yet, as Captain Cook quaintly expresses it, "although they are content to be naked, they are very ambitious to be fine;" for which purpose they adorn themselves with streaks of red, black, and white, and the men as well as the women wear bracelets and anklets of

* l. c. p. 181.

† Darwin's Researches in Geology and Natural History, p. 234.

shell and bone. Dr. Hooker informs us that at the extreme south of Tierra del Fuego, and in mid-winter, he has often seen the men lying asleep in their wigwams, without a scrap of clothing, and the women standing naked, and some with children at their breasts, in the water up to their middles, gathering limpets and other shell-fish, while the snow fell thickly on them and on their equally naked babies. In fact, fire does not appear to be necessary with them, nor do they use it to warm the air of their huts as we do, though sometimes as a luxury they take advantage of it to toast their hands or feet. Doubtless, however, if deprived of this source of warmth, they would die of starvation rather oftener than is now the case.

If not the lowest, the Fuegians certainly appear to be among the most miserable specimens of the human race, and the habits of this people are of especial interest from their probable similarity to those of the ancient Danish shell-mound builders, who, however, were in some respects rather more advanced, being acquainted with the art of making pottery.

CHAPTER XV.

MODERN SAVAGES—*concluded.*

IN reading almost any account of savages, it is impossibl not to admire the skill with which they use thei weapons and implements, their ingenuity in hunting an fishing, their close and accurate powers of observation Some savages even recognize individuals by their footsteps Thus Mr. Laing mentions* that one day while travelling near Moreton Bay in Australia, he pointed to a footstep, and asked whose it was. The guide "glanced at it, without stopping his horse, and at once answered, 'Whitefellow call him Tiger.'" This turned out to be correct, which was the more remarkable as the two men belonged to different tribes, and had not met for two years. Among the Arabs, Burckhardt asserts† that some men know every individual in the tribe by his footstep. "Besides this, every Arab knows the printed footsteps of his own camels, and of those belonging to his immediate neighbours. He knows by the depth or slightness of the impression whether a camel was pasturing, and therefore not carrying any load, or mounted by one person only, or heavily loaded." The North American Indian will send an arrow right through a horse, or even a buffalo. The African savage will kill the elephant, and the Chinook fears not to attack even the whale. Captain Grey tells us that he has often seen the Australians kill a pigeon with a

* Aborigines of Australia, p. 24. † Bedouins and Wahalys, p. 374.

spear, at a distance of thirty paces*. Speaking of the Chamisso Island Esquimaux, Beechey says that one day a Diver was swimming at a distance of thirty yards from the beach, and a native was offered a reward if he could shoot it. He immediately frightened it so that it dived, and directly it reappeared, he transfixed both eyes with an arrow†. Speaking of the Australians, Mr. Stanbridge asserts that "it is a favourite feat on the Murray to dive into the river, spear in hand, and come up with a fish upon it‡." Woodes Rogers says that the Californian Indians used to dive, and strike the fish under water with wooden spears§, and Falkner‖ tells us that some of the Patagonian tribes live chiefly on fish, "which they catch *either* by *diving*, or striking them with their darts." Tertre again says the same of the Caribs¶, and Wallace of the Brazilian Indians**. The South Sea Islanders are particularly active in the water. They dive after fish which "takes refuge under the coral rock; thither the diver pursues him, and brings him up with a finger in each eye††." They are even more than a match for the shark, which they attack fearlessly with a knife. If they are unarmed "they all surround him and force him ashore, if they can but once get him into the surf;" but even if he escapes they continue their bathing without the least fear‡‡. Ellis more cautiously says only, that "when armed they have sometimes been known to attack a shark in the water§§." The Andaman Islanders also are said to dive and catch fish under water‖‖; and Rutherford makes a similar statement as regards the New Zealanders. Dobritzhoffer tells us that

* Grey, l. c. vol. ii. p. 285.

† Beechey's Narrative, vol. ii. p. 574.

‡ On the Aborigines of Victoria. Ethn. Trans. New Ser. vol. i. p. 293.

§ Callander's Voyages, vol. iii. p. 331.

‖ Patagonia, p. 111.

¶ Hist. of the Carriby Is. p. 305.

** Travels on the Amazon, p. 488.

†† Wilson, l. c. p. 385.

‡‡ l. c. p. 368.

§§ Polynesian Researches, vol. i. p. 178.

‖‖ Mouat, l. c. pp. 310. 333.

the Payajuas and Vilelas live principally on fish, using a small net with which they dive, "and if they spy any fish at the bottom, swim after it, catch it in the net," and so bring it to shore*. The Esquimaux in his kayak will actually turn somersaults in the water. Skyring† saw a Fuegian who "threw stones from each hand with astonishing force and precision. His first stone struck the master with much force, broke a powder-horn which hung round his neck, and nearly knocked him backwards." In his description of the Hottentots, Kolben says‡, that their dexterity in throwing the "hassagaye and rackum-stick, strikes every witness of it with the highest admiration. . . . . If a Hottentot, in the chase of a hare, deer, or wild goat, comes but within thirty or forty yards of the creature, away flies the rackum-stick and down falls the creature, generally pierced quite through the body." The death of Goliath is a well-known instance of skill in the use of the sling; and we are told also that in the tribe of Benjamin there was a corps of "seven hundred chosen men lefthanded; every one could sling stones at an hair-breadth, and not miss§." The Brazilian Indians kill turtles with bows and arrows; but if they aimed direct at the animal, the arrow would glance off the smooth hard shell, therefore they shoot up into the air, so that the arrow falls nearly vertically on the shell, which it is thus enabled to penetrate‖.

What an amount of practice must be required to obtain such skill as this! How true also must the weapons be! Indeed, it is very evident that each distinct type of flint implement must have been designed for some distinct purpose. Thus the different forms of arrowhead, of harpoon, or of stone axe, cannot have been intended to be used in the

* History of the Abipones, vol. i. p. 343.

† Fitzroy, l. c. vol. i. p. 398.

‡ Kolben, l. c. vol. i. p. 243.

§ Judges xx. 16.

‖ Wallace's Amazon, p. 466.

same manner. Among the North American Indians the arrows used in hunting were so made that when the shaft was drawn out of the wound the head came out also; while in the war arrows the shaft tapered to the end, so that even when it was withdrawn the head of the arrow remained in the wound. Again, the different forms of harpoons are illustrated by the barbed and unbarbed lances of the Esquimaux (ante, p. 504). Unfortunately, however, we have but few details of this kind; travellers have generally thought it unnecessary to observe or record these apparently unimportant details; and that our knowledge of flint implements is most rudimentary, is well shown by the discussion between Professors Steenstrup and Worsaae, whether the so-called "axes" of the shell-mounds were really axes, or whether they were not rather used in fishing.

We may hope, however, that in future those who have the opportunity of observing stone implements among modern savages will give us more detailed information both as to the exact manner in which they are used, and also about the way in which they are made; that they will collect not only the well-made weapons, but also, and even more carefully, the humble implements of every-day life.

Some archæologists have argued that the shell-mound builders of Denmark must have possessed more formidable weapons than any that have yet been found, because it was considered impossible that they could have killed large game, as, for instance, the bull and seal, with the simple weapons of bone and stone, which alone have hitherto been discovered. Professor Worsaae*, even goes so far as to say, "Against birds and other small creatures these stone arrows might prove effectual, but against larger animals, such as the aurochs, the elk, the reindeer, the stag, and the wild boar, they were evidently insufficient; particularly since

* Page 18.

these animals often become furious as soon as they are struck." I can, however, by no means agree with Professor Worsaae in this supposition; we know, on the contrary, that modern savages are able to kill even the largest game with arrows and spears tipped with stone. Knives, again, of stone, are much more effective than might at first be expected, and many savage tribes readily cut flesh with pieces of shell or of hard wood.

The neatness with which the Hottentots, Esquimaux, North American Indians, etc., are able to sew is very remarkable, although awls and sinews would in our hands be but poor substitutes for needles and thread. As already mentioned in p. 332, some cautious archæologists hesitated to refer the reindeer caves of the Dordogne to the Stone Age, on account of the bone needles and the works of art which are found in them. The eyes of the needles especially, they thought, could only be made with metallic implements. Professor Lartet ingeniously removed these doubts by making a similar needle for himself with the help of flint; but he might have referred to the fact stated by Cook* in his first voyage, that the New Zealanders succeeded in drilling a hole through a piece of glass which he had given them, using for this purpose, as he supposed, a piece of jasper.

The Brazilians also use ornaments of imperfectly crystallized quartz, from four to eight inches long and about an inch in diameter. Hard as it is, they contrive to drill a hole at each end, using for that purpose the pointed leaf-shoot of the large wild plantain, with sand and water. The hole is generally transverse, but the ornaments of the chiefs are actually pierced lengthways. This, Mr. Wallace thinks, must be a work of years†.

The works of art found in the Dordogne caves are little

* Vol. iii. p. 464.

† Travels on the Amazon, p. 278.

ruder than those of the Esquimaux or the North American Indians. In fact, the appreciation of art is to be regarded rather as an ethnological characteristic than as an indication of any particular stage in civilization. We see, again, that in many cases a certain knowledge of agriculture has preceded the use of metals; and the fortifications of New Zealand, as well as the large morais of the South Sea Islands, are arguments in favour of the theory which ascribes some of our camps, our great tumuli, and other Druidical remains, to the later part of the Stone Age. The great morai of Oberea, in Tahiti, has been already described (p. 483). Again, the celebrated statues of Easter Island are really colossal. One of them, which has fallen down, measures twenty-seven feet long, and others appear to be even larger. The houses of the Ladrone Islanders, also, are very remarkable. The larger ones were supported on strong pyramids of stone. These were, according to Freycinet*, in one piece, made of chalk, sand, or large stones, imbedded in a kind of cement. They were found in large numbers; in one case they formed a stone row four hundred yards long. They were first described by Anson, who saw many which were thirteen feet in height; while one of those seen by Freycinet measured as much as twenty feet. They were square at the base, and rested on the ground. On each pillar was a hemisphere, with the flat side upwards. The South Sea Islanders afford, indeed, wonderful instances of what can be accomplished with stone implements. Their houses are large and often well built, and their canoes have excited the wonder of all who have seen them.

Although, then, the use of stone as the principal material of implements and weapons may be regarded as characterizing an early stage in the development of civilization, still, it is evident that this stage is itself susceptible of much

* Vol. ii. p. 318.

subdivision. The Mincopie or the Australian, for instance, is not to be compared for an instant with the semi-civilized native of the Society Islands. So also in the ancient Stone Age of Europe, we find evidences of great difference. The savage inhabitants of the South French caves had, according to MM. Christy and Lartet, no domestic animals, and no knowledge of pottery or agriculture. The shell-mound builders of Denmark had the dog; the Swiss Lake-dwellers also possessed this animal, together with the ox, sheep, and pig, perhaps even the horse; they had a certain knowledge of agriculture, and were acquainted with the art of weaving. Thus, then, even when we have satisfied ourselves that any given remains belong to the Stone Age, we are still but on the threshold of our inquiry.

Travellers and naturalists have varied a good deal in opinion as to the race of savages which is entitled to the unenviable reputation of being the lowest in the scale of civilization. Cook, Darwin, Fitzroy, and Wallis were decidedly in favour, if I may so say, of the Fuegian; Burchell maintained that the Bushmen are the lowest; D'Urville voted for the Australians and Tasmanians; Dampier thought the Australians "the miserablest people in the world;" Forster said that the people of Mallicollo "bordered the nearest upon the tribe of monkeys;" Owen inclines to the Andamaners; others have supported the North American Root-diggers; and one French writer even insinuates that monkeys are more human than Laplanders.

The civilization, moreover, of the Stone Age differs not only in degree, but also in kind, varying according to the climate, vegetation, food, etc.; from which it becomes evident—at least to all those who believe in the unity of the human race—that the present habits of savage races are not to be regarded as representing exactly those which characterized the first men, but as depending also on external conditions,

influenced indeed to a certain extent by national character, which, however, is after all but the result of the external conditions which have acted on previous generations.

If we take a few of the things which are most generally useful in savage life, and at the same time most easily obtainable, such, for instance, as bows and arrows, slings, spear-casters, pottery, domestic animals, or a knowledge of agriculture, we might perhaps have expected *à priori* that the acquisition of them would have followed some regular succession. That this, however, was not the case is shown by the annexed table, which will, I think, be found interesting. It gives some idea of the progress made by various savage tribes, at the time when they were first visited by Europeans.

Some of the differences exhibited in this table may indeed be easily accounted for. The frozen soil and arctic climate of the Esquimaux would not encourage, would not even permit, any agriculture. So, again, the absence of hogs in New Zealand, of dogs in the Friendly Isles, and of all mammalia in Easter Island, is probably due to the fact that the original colonists did not possess these animals, and that their isolated position prevented them afterwards from obtaining any. Moreover, we must remember that as a general rule, the lowest savage can only use one or two weapons. He is limited to those which he can carry about with him, and naturally prefers those which are of most general utility*. We cannot, however, in this manner, account for all the facts. In Columbia, Australia, the Cape of Good Hope, and elsewhere, agriculture was unknown before the advent of Europeans. Easter Island, on the contrary, contained large plantations of sweet potatoes, yams, plantains, sugar-canes, etc. Yet the Chinooks of Columbia had bows and arrows,

* Weapons of war depending very much on the caprice of chiefs, are probably more liable to change than those used in hunting.

fish-hooks, and nets; the Australians had throwing-sticks, boomerangs, fish-hooks, and nets; the Hottentots had bows and arrows, nets, fish-hooks, pottery, and at last even a certain knowledge of iron; all of which seem to have been unknown to the Easter Islanders, though they would have been very useful, and, excepting the iron, might have been invented and used by them.

If the case of Easter Island stood alone, the absence of bows and arrows might, perhaps, be plausibly accounted for by the absence of game, the scarcity of birds, and the isolation of the little island, which rendered war almost impossible. But such an argument cannot be applied to other cases which are indicated in the table. Let us compare, for instance, the Atlantic tribes of North American Indians, the Australians, Caffres, Bushmen, New Zealanders, and Society Islanders. All these were constantly at war, and the two first lived very much on the produce of the chase. They at least had therefore similar wants. Yet spears and perhaps clubs were the only weapons which they had in common; the North Americans had good bows and arrows, the Society Islanders and Bushmen had bad ones—in fact, those of the former were so weak as to be useless in war—the Australians, Caffres, and New Zealanders, had none. On the other hand, the Australians had the throwing-stick and the boomerang; the Society Islanders used slings; and the New Zealanders, besides very effective clubs, had numerous and extensive fortifications. It is certainly most remarkable that tribes so warlike, and in many respects so advanced, as the New Zealanders and Caffres, should have been ignorant of bows and arrows, which were used by many very low races, such as the Fuegians, the Chinooks, the Andamaners, and Bushmen; particularly as it is impossible to doubt that the New Zealanders at least would have found bows of great use, and that any of their tribes, having in-

—	Easter Islanders.	Fuegians.	Bushmen.	Hottentots.	Andamaners.	Australians.		Esquimaux.		North American Indians.		New Zealanders.	Feegeeans.	Society Islanders.	Friendly Islanders.
						North-East.	West.	Southern.	Northern.	West.	East.				
Bows and Arrows	...	Weak	Weak	Weak	Good	...	...	Good	...	Good	Good	...	Good	Weak	Weak
Slings	...	Yes	...	...	...	...	...	Yes	...	Yes	Yes	...	Yes	Yes	?
Throwing-Sticks..	...	...	...	...	...	Yes	Yes	Yes	?	...	...	...	...	...	...
Boomerangs	...	...	...	...	...	Yes	Yes	...	...	...	...	...	...	...	...
Bolas	...	...	...	...	...	...	...	Yes	?	...	...	...	...	...	...
Pottery	...	...	...	Yes	...	...	...	...	...	...	Yes	...	Yes	...	...
Canoes.....	Bad	Bad	...	...	Good	...	Bad	Good	...	Bad	Middling	Very good	Very good	Very good	Very good
Agriculture.....	...	...	...	...	...	...	...	...	...	...	Maize	Yes	Yes	Yes	Yes
Fortifications	...	...	...	...	...	...	...	...	...	...	...	Many	Yes	...	Yes
Fish-hooks	...	Stone	...	Iron	?	...	Neat	Bone	...	Yes	Yes	Bone and shell	Bone and shell	Bone and shell	Shell
Nets.....	...	...	...	Yes	Good	...	Neat	Small	For bird catching.	Yes	Yes	Large	Yes	Large	Yes
Dogs	...	For hunting	For hunting.	For hunting.	...	For hunting.	For hunting.	For draught.	For draught.	For wool & hunting.	For hunting.	For food	For food	For food	...
Hogs (Domestic)	...	...	...	...	...	...	...	...	...	...	...	...	Some	Many	...

vented them, would have had an immense advantage in the "struggle for existence." Other similar contrasts will strike any one who examines the table; but perhaps it may be said that some of these cases may be explained by the influence of more civilized neighbours; that the comparison above-made, for instance, might be regarded as unfair, because the New Zealanders were an isolated race, while the Chinooks might have derived their knowledge of bows and arrows from the eastern tribes, and these again might have acquired the art of making pottery from the semi-civilized nations of the south. No one can deny that this may be true in some instances, because we know that at the present day most savages possess hatchets, knives, beads, etc., which they have received from traders, and which they cannot yet manufacture for themselves.

It is certainly possible that the Chinooks may have derived their knowledge of the bow from their northern neighbours; but we can hardly suppose that they did so from the Red Indian tribes to the east, because in that case it is difficult to understand why they should not also have learnt from these the much simpler, and almost equally useful, art of making pottery. Moreover there are some cases in which any such idea is absolutely out of the question; thus, the spear-caster is used by the Esquimaux, the Australians, the New Caledonians, and some Brazilian tribes, the bolas by the Esquimaux and the Patagonians; the boomerang is peculiar to the Australians*. The "sumpitan" or blow-pipe of the Malays occurs again in the valley of the Amazon. Again, different races of savages have but little peaceful intercourse with one another. They are almost always at war. If their habits are similar, they are deadly rivals, fighting for the

* The negroes of Niam Niam have iron crescents resembling boomerangs, which are thrown in war. But these do not appear to possess the peculiar properties of the boomerang.

best hunting-grounds or fisheries; if their wants are different, they fight for slaves, for women, for ornaments; or if they do not care about any of these, for the mere love of fighting, for scalps, heads, or some other recognized emblems of glory. In this condition of society each tribe lives in a state either of isolation from, or enmity with, its neighbours. *Delenda est Carthago* is the universal motto, and savages can only live in peace when they have a little world of their own. Sometimes a broad sea, or a high range of mountains, at others a wide "march" or neutral territory supply the necessary conditions, and keep them apart. They meet only to fight, and are therefore not likely to learn much from one another. Moreover, there are cases in which some tribes have weapons which are quite unknown to their neighbours. Thus, among the Brazilian tribes we find the bow and arrow, the blow-pipe, the lasso, and the throwing-stick. The first is the most general, but the Barbados use only the blow-pipe, the Moxos have abandoned the bow and arrow for the lasso, and the Purupurus are distinguished from all their neighbours by using, not bows and arrows, but the "palheta," or throwing-stick. Again, the Caffres have not generally adopted the bows and arrows of the Bushmen; the Esquimaux have not acquired the art of making pottery from the North American Indians, nor the southern Columbian tribes from the northern Mexicans.

Many, again, of the ruder arts, as for instance the manufacture of pottery and of bows, are so useful, and at the same time, however ingenious in idea, so simple in execution, as to render it highly improbable that they would ever be lost, when they had once been acquired. Yet we have seen that the New Zealanders and Caffres had no bows, and that none of the Polynesians had any knowledge of pottery; though it is evident from their skill in other manufactures, and their general state of civilization, that they would have found no

difficulty in the matter, if the manner had once occurred to them. Again, "bolas" are a most effectual weapon, and there is certainly no difficulty in making them, yet the knowledge of them appears to be confined to the Patagonians and the Esquimaux. The art of pottery, on the contrary, sometimes has been, I believe, communicated by one race to another. Nevertheless, there are cases, even among existing races*, in which we seem to find indications of an independent discovery; at any rate, in which the art is in a rudimentary stage.

On the whole, then, from a review of these, and other similar facts which might have been mentioned, it seems to me most probable that many of the simpler weapons, implements, etc., have been invented independently by various savage tribes, although there are no doubt also cases in which they have been borrowed by one tribe from another.

The contrary opinion has been adopted by many writers on account of the undeniable similarity existing between the weapons used by savages in very different parts of the world. But however paradoxical it may sound, though the implements and weapons of savages are remarkably similar, they are at the same time curiously different. No doubt the necessaries of life are simple and similar all over the world. The materials also with which man has to deal are very much alike; wood, bone, and to a certain extent stone, have every where the same properties. The obsidian flakes of the Aztecs resemble the flint flakes of our ancestors, not so much because the ancient Briton resembled the Aztec, as because the fracture of flint is like that of obsidian. So also the pointed bones used as awls are necessarily similar all over the world. Similarity exists, in fact, rather in the raw material than in the manufactured article, and some even of the simplest implements of stone are very different among dif-

* See, for instance, p. 494.

ferent races. The adze-like hatchets of the South Sea Islanders are unlike those of the Australians or ancient Britons; the latter again differ very much from the type which is characteristic of the Drift or Archæolithic period.

Again, the habits and customs of savages while presenting many remarkable similarities which, as it seems to me, go far to prove the unity of the human race, still differ greatly, and thus give strong evidence of independent development. Many, indeed, of those differences which must have struck any one in reading the preceding part of the chapter, follow evidently and directly from the external conditions in which different races are placed. The habits of an Esquimaux and a Hottentot could not possibly be similar. But let us take some act which is common to many races, and is susceptible of being accomplished in several ways. For instance, most savages live in part on the flesh of birds; how is this obtained? Generally with bows and arrows; but while the Australians catch birds with the hand, or kill them with the simple spear or the boomerang, the Fuegians have both the sling and the bow, while the Esquimaux use a complex spear with several points, or a projectile which consists of a number of walrus teeth fastened together by short pieces of string, and thus forming a kind of bolas. The northern tribes visited by Kane practised a different method. They caught large numbers of birds—especially little auks—in small nets, resembling landing-nets, with long ivory handles. Yet this very people were entirely ignorant of fishing*.

Take, again, the use made of the dog. At first, probably, the dog and the man hunted together†; the cunning of the one supplemented the speed of the other, and they shared the produce of their joint exertions. Gradually mind as-

* Kane, Arctic Explorations, vol. ii. pp. 203. 243.

† The low American Wood Indians, however, used the dog rather as a watchdog than as a hound.

serted its pre-eminence over matter, and the man became master. Then the dog was employed in other ways, less congenial to his nature. The Esquimaux forced him to draw the sledge; the Chinook kept him for the sake of his wool; the South Sea Islanders, having no game, bred the dog for food; the Chonos Indians taught him to fish; where tribes became shepherds, their dogs became shepherds also; finally, it is recorded by Pliny that in ancient times troops of dogs were trained to serve in war. Even the ox, though less versatile than the dog, has been used for the first and the two last of these purposes.

Again, in obtaining fire, two totally different methods are followed; some savages, as for instance the Fuegians, using percussion, while others, as the South Sea Islanders, rub one piece of wood against another. Opinions are divided whether we have any trustworthy record of a people without the means of obtaining fire. It has been already mentioned (pp. 445. 451) that some of the Australians and Tasmanians, though acquainted with fire, did not know how to obtain it. In his history of the Ladrone Islands, Father Gobien asserts that fire, "an element of such universal use, was utterly unknown to them, till Magellan, provoked by their repeated thefts, burned one of their villages. When they saw their wooden houses blazing, they first thought the fire a beast which fed upon wood, and some of them who came too near, being burnt, the rest stood afar off, lest they should be devoured, or poisoned, by the violent breathings of this terrible animal." This fact is not mentioned in the original account of Magellan's Voyage. Freycinet believes that the assertion of Father Gobien is entirely without foundation. The language, he says, of the inhabitants contains words for fire, burning charcoal, oven, grilling, boiling, etc.; and even before the advent of the Europeans, pottery* was well known.

* l. c. vol. ii. p. 166.

It is difficult, however, to get over the distinct assertion made by Gobien, which moreover derives some support from similar statements made by other travellers. Thus Alvaro de Saavedra states that the inhabitants of certain small islands in the Pacific which he called "Los Jardines," but which cannot now be satisfactorily determined, stood in terror of fire because they had never seen it*. Again, Wilkes tells us† that on the island of Fakaafo, which he calls "Bowditch," "there was no sign of places for cooking, nor any appearance of fire." The natives also were very much alarmed when they saw sparks struck from flint and steel. Here, at least, we might have thought, was a case beyond question or suspicion; the presence of fire could hardly have escaped observation; the marks it leaves are very conspicuous. If we cannot depend on such a statement as this, made by an officer in the United States' Navy, in the official report of an expedition sent out especially for scientific purposes, we may well be disheartened, and lose confidence in Ethnological investigations. Yet the assertions of Wilkes *are* questioned, and with much appearance of justice, by Mr. Tylor‡. In the "Ethnography of the United States' Exploring Expedition," Hale gives a list of Fakaafo words, in which we find *afi* for "fire." This is evidently the same word as the New Zealand *ahi*; but as it denotes light and heat, as well as fire, we might suppose that it thus found its way into the Fakaafo vocabulary. I should not, therefore, attribute to this argument quite so much force as does Mr. Tylor. It is, however, evident that Captain Wilkes did not perceive the importance of the observation, or he would certainly have taken steps to determine the question; and as Hale, in his special work on the Ethnology of the Expedition, does not say a word on the subject, it is clear he had

* Hackluyt Soc. 1862, p. 178. † United States' Expl. Exped. vol. v. p. 18.
‡ Early History of Mankind, p. 230.

no idea that the inhabitants of Fakaafo exhibited such an interesting peculiarity. The fact, if established, would be most important; but it cannot be said to be satisfactorily proved that there is at present, or has been within historical times, any race of men entirely ignorant of fire. It is at least certain that as far back as the earliest Swiss lake-villages, and Danish shell-mounds, the use of fire was well known in Europe.

On the other hand, as already mentioned, some of the Tasmanian and Australian tribes, though well acquainted with the use of fire, knew no way of kindling it. Consequently they take great pains to keep it always burning; and if by any mischance it should be extinguished, are obliged to get a fresh light from some neighbouring tribe.

There is, again, scarcely any conceivable way in which the dead could be disposed of, which has not been adopted in some part of the world. Among some races the corpse is simply buried; by others it is burned. Some of the North American Indians expose their dead on scaffolds in the branches of trees. Some tribes deposit them in sacred rivers, others in the sea. Among the Sea Dyaks the dead chief is placed in his war canoe, with his favourite weapons and principal property, and is thus turned adrift. Other tribes gave their dead to be food for wild beasts; and others preferred to eat them themselves. Some Brazilian tribes *drink* the dead*. The Tarianas and Tucanos, and some other tribes, about a month after the funeral, disinter the corpse, which is then much decomposed, and put it in a great pan or oven, over the fire, till all the volatile parts are driven off with a most horrible odour, leaving only a black carbonaceous mass, which is pounded into a fine powder, and mixed in several large conches of caxiri: this is drunk by the assembled company, under the full belief that the virtues of the deceased

* Wallace, Travels on the Amazon, p. 498.

will thus be transmitted to the drinkers. The Cobeus also drink the ashes of the dead in the same manner.

Indeed, if there are two possible ways of doing a thing, we may be sure that some tribes will prefer one, and some the other. It seems natural to us that descent should go in the male line; but there are very many races in which it is traced from the mother, not the father. The husband or father seems to us to be the natural head of the family; in Tahiti the reverse is the case, and the son enters at once into the property and titles of his father, who then holds them only as a guardian or trustee; so that among this extraordinary people, not the father, but the son, is in reality the head of the family. So also in Australia, the father is called after the son, not the son after the father. At Cape York and in the neighbouring islands the youngest son has a double share*. Among the New Zealanders Mr. Brown assures us that the *youngest* son succeeded to the property of the father†. Among the Wanyameuzi, property descends not to the legitimate, but to the illegitimate children‡. There are many races in which those holding certain relationships are forbidden to talk to one another, an extraordinary superstition which, as we have seen (p. 461), reaches its climax among the Feegeeans.

It seems natural to us that after childbirth, the woman should keep her bed; and that as far as possible the husband should relieve her for a time from the labours and cares of life. In this, at least, one might have thought that all nations would be alike. Yet it is not so. Among the Caribs the father, on the birth of a child, took to his hammock, and placed himself in the hands of the doctor, the mother meanwhile going about her work as usual. A similar

* McGillivray, Voyage of H.M.S. Rattlesnake, vol. ii. p. 28.
† New Zealand and its Aborigines, p. 26.
‡ Burton's Lake Regions of Africa, p. 193.

custom has been observed on the mainland of South America, among the Abipones, Mundrucus, Fuegians, etc.; among the Arawaks of Surinam; in the Chinese province of West Yunnan; among the Dyaks of Borneo, and the Esquimaux of Greenland. It is mentioned by Xenophon as occurring in Asia Minor, and by Strabo among the Iberians; is found even in the present day among the Basques, among whom we are told that in some of the valleys, the "women rise immediately after childbirth, and attend to the duties of the household, while the husband goes to bed, taking the baby with him, and thus receives the neighbours' compliments." The same habit has been noticed also in the South of France; according to Diodorus Siculus, it prevailed at his time in Corsica; and finally it "is said still to exist in some cantons of Bearn, where it is called faire la couvade."

Again, the love of life—the dread of death—are among the strongest of our feelings. "Every thing that a man hath he will give in exchange for his life." This is true, but by no means universally so. According to Azara, the Indians of Paraguay have a great indifference to death; and we have already seen that this is the case with the Feegeeans, while Burton makes a similar statement as regards the negroes of Dahomey. Among the Chinese it is said that a man condemned to death, if permitted to do so, may always secure a substitute on payment of a moderate sum of money, and a coffin is regarded as a most appropriate present for an aged relative.

Again, the sounds of which language is constituted differ extremely in different parts of the world. The clicks of the Hottentots are a striking illustration of this. The Hurons did not use the labials; the Indians of Port au Français in Columbia, according to M. de Lamanon *, make no use of the consonants *b*, *f*, *r*, *j*, *l*, *p*, or *v*. The Peruvian language

* Voyage de la Perouse, vol. ii. p. 211.

wanted the letters *b*, *d*, *f*, *g*, *s*, and *x**. The Australians did not use the sound conveyed by our letter *s*†. Many of the negroes have no *r*. The Feegeeans do not use the letter *c*, the Somo-Somo dialect has no *k*, that of Rakiraki and other parts no *t*‡. The Society Islanders and Australians exclude both *s* and *c*§. In representing the New Zealand language the missionaries found themselves able to discard no less than thirteen letters, namely, *b*, *c*, *d*, *f*, *g*, *j*, *l*, *q*, *s*, *v*, *x*, *y*, and *z*||. Shotland asserts that whistling was unknown in New Zealand¶.

Even the symbols by which the feelings are expressed are very different in different races. Kissing appears to us the natural expression of affection. "'Tis certain," says Steele, "nature was its author, and it began with the first courtship." On the contrary it was entirely unknown to the Tahitians, the New Zealanders**, the Papouans††, and the aborigines of Australia, nor was it in use among the Somals‡‡, or the Esquimaux§§. The Hill tribes of Chittagong do not say "Kiss me," but "Smell me|||." The Malays¶¶, Feegeeans***, Tongans, and many other Polynesians always sit down when speaking to a superior; the inhabitants of Mallicollo testify "admiration by hissing like a goose†††," the sound being perhaps like our "hush," a call for silence, and hence a mark of

* Garcilasso de la Vega. Markham's Translation, Author's Preface, p. x.

† Freycinet, vol. ii. p. 757; D'Urville, vol. i. pp. 188. 199. 481.

‡ Figi and the Figians, vol. i. p. v. 257.

§ Polynesian Researches, vol. i. p. 77.

|| Brown, New Zealand and its Aborigines, p. 100.

¶ Traditions of the New Zealanders, p. 134.

** D'Urville, vol. ii. p. 561; Voyage of the Novara, vol. iii. p. 106.

†† Freycinet, vol. ii. p. 56.

‡‡ Burton's First Footsteps in Africa, p. 123.

§§ Lyon's Journal, p. 353.

||| Lewin, Hill Tribes of Chittagong, p. 46.

¶¶ Memoirs of a Malayan Family, Marsden, p. 37.

*** Williams, Figi and the Figians, vol. i. p. 38.

††† Cook's Second Voyage, vol. ii. p. 36.

interest; the mode of showing respect among the Todas of the Neilgherry hills is by raising the open right hand to the face, resting the thumb on the bridge of the nose; at Vatavulu* it is respectful to turn one's back on a superior, especially in addressing him. The same custom occurs in Congo†; Denham found it in central Africa‡; and Speke among the Wahuma in the East §. According to Freycinet, tears were regarded in the Sandwich Islands as a sign of happiness ‖; and some of the Esquimaux pull noses as a token of respect ¶. Spix and Martius assure us that blushing was unknown among the Brazilian Indians; and that only after long intercourse with Europeans, does a change of colour become in them any indication of mental emotion**.

Again we find the most striking differences of feeling in the matter of clothing. The Turk thinks it highly improper for a woman to show her face. The sculptures on early Indian temples show that a race may attain to a considerable degree of civilization without perceiving any necessity whatever for clothing. This is the case with the women listening to Buddha while preaching, and even Buddha's wife and Maya his mother†† are habitually so represented; indeed Mr. Fergusson does not hesitate to say that "before the Mahomedan conquest nudity in India conveyed no sense of indecency."

The ideas of virtue also differ extremely. Neither faith, hope, nor charity enters into the virtues of a savage. The Sichuana language contains no expression for thanks; the Algonquin had no word for love; the Tinnè no word

* Figi and the Figians, vol. i. p. 154.

† Astley's Voyage and Travels, vol. iii. p. 72.

‡ Travels and Discoveries in Africa, vol. ii. p. 27; vol. iii. p. 15.

§ Discovery of the Source of the Nile, p. 206.

‖ l. c. vol. ii. pp. 542. 589.

¶ Ross, Baffin's Bay, p. 118.

** Vol. i. p. 376.

†† See for instance Fergusson's Tree and Serpent Worship. Pl. lxxiv. and passim.

for beloved; mercy was with the North American Indians a mistake, and peace an evil; theft, says Catlin, they "call capturing;" humility is an idea which they could not comprehend. Among the Koupouees the greatest misconduct, says Major McCulloch, "is to forgive an enemy, the first virtue is revenge*."

Among the ancient Greeks we see in Homer that the deceitful cunning of Ulysses was looked upon with approval.

"Is a man to starve," said an African, indignantly, to Capt. Burton, "while his sister has children whom she might sell?" This sentiment reads at first like the acme of selfishness, but this impression would perhaps be unjust. Marsden records a Sumatran Malay as saying, in admiration of an European watch, "Is it not fitting that such as we should be slaves to people who have the ingenuity to invent, and the skill to construct, so wonderful a machine†?"

Chastity before marriage was not reckoned as a virtue by the New Zealanders‡ or Cree Indians§; it was disapproved of, though for very different reasons, by some of the Brazilian tribes, by the inhabitants of the Ladrones, and by the Andamaners. On the other hand, the Australians would have been shocked at a man marrying a woman of his own family name; the Abipones thought it a sin for a man to pronounce his own name; the Tahitians thought it very wrong to eat in company, and were horrified at an English sailor, who carried some food in a basket on his head. This prejudice was also shared by the New Zealanders‖, while the Feegeeans, who were habitual cannibals, who regarded mercy as a weakness, and cruelty as a virtue, fully believed that a woman who was not tattooed in an orthodox manner during

* Selection from the Records of the Government of India. By Major W. McCulloch, p. 75.

† History of Sumatra, p. 205.

‡ Brown, New Zealand and its Aborigines, p. 35.

§ Franklin's Journeys to the Polar Seas, vol. i. p. 132. Dunn's Oregon Territory, p. 92.

‖ D'Urville, vol. ii. p. 533.

life, could not possibly hope for happiness after death. This curious idea is also found among the Esquimaux. Hall tells us that they tattoo "from principle, the theory being that the lines thus made will be regarded in the next world as a sign of goodness*." It seems to the Veddahs the most natural thing in the world that a man should marry his younger sister, but marriage with an elder one is as repugnant to them as to us. Among the Friendly Islanders the chief priest was considered too holy to be married; but he had the right to take as many concubines as he pleased; and even the chiefs dared not refuse their daughters to him. In Western Africa the women of the reigning families might have as many lovers as they wished, but were forbidden to degrade themselves by marriage. Among the natives of New South Wales, though the women wore no clothes, it was thought indecent for young girls to go naked†.

Many savage races think it wrong for a woman to have twins; among the Ibos of Eastern Africa, for instance, in such a case the children were exposed to wild beasts and the mother was driven out of society‡. There also it is thought unlucky to cut the upper teeth before the lower ones, and "You cut your top teeth first" is the bitterest of insults. I cannot indeed but think that the differences observable in savage tribes, are even more remarkable than the similarities.

In endeavouring to estimate the moral character of savages, we must remember not only that their standard of right and wrong was, and is, in many cases, very different from ours, but also that, according to the statements of travellers, some of them can hardly be regarded as responsible beings, and

* Life with the Esquimaux, vol. ii. p. 315.

† D'Urville, vol. i. p. 471; Voyage of the Rattlesnake, vol. i. p. 49.

‡ Burton's Lake Regions of Africa, p. 90. See for other instances of this, my Origin of Civilization, 2nd ed. p. 25.

have not attained to any notions, however faulty and undefined, of moral rectitude*. But where such notions do exist they differ widely, as we have seen, from our own; and it would open up too large a question to inquire whether, in all cases, our standard is the correct one.

In considering the character of women belonging to savage or semi-savage races, we must also remember that savages often regard the white men as beings of a superior order. Thus M. du Chaillu tells us that some of the African savages looked upon him as a superior being; and the South Sea Islanders worshipped Captain Cook as a deity. Even when they had killed him, and cut him into small pieces, the inhabitants of Owhyhee fully expected him to re-appear, and frequently asked "what he would do to them on his return†." However absurd and extravagant such a belief may at first sight appear, it must be admitted that it is in many respects very natural. Savages can only raise their minds to the conception of a being a few degrees superior to themselves, and Captain Cook was more powerful, wiser, and, we may add, more virtuous, than most of their so-called "Deities." Under these circumstances, although it must be admitted that the chastity of the women is not, as a general rule, much regarded among savages, we must not too severely condemn them on this account. It is not surprising that any connexion with white men is regarded rather as an honour than as a disgrace: the Europeans hold, in fact, almost the same position in public estimation as did the amorous deities of ancient mythology.

Again, with savages, as with children, *time* appears longer than it does to us, and a temporary marriage as natural and honourable as one that is permanent. Hospitality, again, is

* See, for instance, Burchell, vol. i. p. 461.

† Cook's Voyage to the Pacific Ocean. By Capt. King, F.R.S. vol. iii. p. 69.

frequently carried so far that it is thought wrong to withhold from a guest any thing that might contribute to his comfort, and unless therefore he was provided with a temporary wife, hospitality would be regarded as incomplete. This custom is found throughout North America and the South Sea Islands, among the Abyssinians, Bedouins, Kaffirs, Patagonians, and other races. Among the Esquimaux it is considered a great mark of friendship for two men to exchange wives for a day or two. It has been already mentioned that a Kandyan chief, described by Mr. Bayley, was quite scandalized at the idea of having only one wife. It was, he said, "just like monkeys." When Captain Cook was in New Zealand, his companions contracted many temporary marriages with the Maori women; these were arranged in a formal and decent manner, and were regarded, by the New Zealanders at any rate, as perfectly regular and innocent*. Regnard† assures us that the Lapps preferred to marry a girl that had had a child by a white man, thinking "that because a man whom they believe to be possessed of a better taste than themselves has been anxious to give marks of his love for a girl of their country, she must, therefore, be possessed of some secret merit." Even at the present day, Lady Duff Gordon tells us, in her paper on the Cape‡, that "there are no so-called 'morals' among the coloured people, and how or why should there? It is an honour to one of these girls to have a child by a white man." Taking all these facts into consideration, the intercourse which has taken place between Europeans and women of lower tribes must not, I think, be too severely condemned, or rather the blame ought to fall on us and not on them. But, even among savages themselves, we must admit that female virtue is, in

* Cook's First Voyage, vol. iii. p. 450.
† Pinkerton, Journey to Lapland, vol. i. p. 166.
‡ Vacation Tourists, 1863, p. 178.

many cases, but slightly regarded; as, indeed, is but natural when women themselves are looked upon as little better than domestic animals. Among many tribes, for instance the South Sea Islanders and the Esquimaux, indecent dances are not only common, but are countenanced by women of the highest rank, to whom it does not appear to occur that there is any harm or impropriety in them. According to Ulloa*, the Brazilians do not approve of chastity in an unmarried woman, regarding it as a proof that she can have nothing attractive about her. The inhabitants of the Ladrones †, and of the Andaman Island ‡, come to the same conclusion; in the latter case, however, for a different reason, regarding it as a proof of selfishness and pride. Judged by our standards these facts are very dreadful; but we must remember they did not entail on savages the same fatal consequences as with us; and before we condemn them too severely, let us remember our own literature and our own morality, even in the last century.

The harsh, not to say cruel treatment of women, which is almost universal among savages, is one of the deepest stains upon their character. They regard the weaker sex as beings of an inferior order, as mere domestic drudges. Nor are the labours and sufferings of the women sweetened by any great affection on the part of those for whom they toil. We have already seen that the Algonquins had no word for "love" in their language, and that the Tinnè Indians had no equivalent for "dear" or "beloved." Captain Lefroy § says, "I endeavoured to put this intelligibly to Nannette, by supposing such an expression as ma chère femme; ma chère fille. When at length she understood it, her reply was (with great emphasis), 'I' disent jamais ça; i' disent ma femme, ma

* Pinkerton, vol. xiv. p. 521.
† Freycinet, vol. ii. p. 370.
‡ Trans. Ethn. Soc. New Ser. vol. ii. p. 35.
§ Richardson's Arctic Expedition, vol. ii. p. 24.

fille.'" Spix and Martius* tell us that among the Brazilian tribes the father has scarcely any, the mother only an instinctive affection for the child. There can be no doubt that, as an almost universal rule, savages are cruel, but we must remember that they are less sensitive to pain than those who spend much of their time in-doors, and that in many cases they inflict upon themselves also the most horrible tortures.

Savages have often been likened to children, and the comparison is not only correct, but also highly instructive. Many naturalists consider that the early condition of the individual indicates that of the race,—that the best test of the affinities of a species are the stages through which it passes. So also it is in the case of man; the life of each individual is an epitome of the history of the race, and the gradual development of the child illustrates that of the species. Hence the importance of the similarity between savages and children. Savages, like children, have no steadiness of purpose. Speaking of the Dogrib Indians, we found, says Richardson†, "by experience, that however high the reward they expected to receive on reaching their destination, they could not be depended on to carry letters. A slight difficulty, the prospect of a banquet on venison, or a sudden impulse to visit some friend, were sufficient to turn them aside for an indefinite length of time." Even among the comparatively civilized South Sea Islanders this childishness was very apparent. "Their tears indeed‡, like those of children, were always ready to express any passion that was strongly excited, and like those of children they also appear to be forgotten as soon as shed." D'Urville also mentions that Tai-wanga, a New Zealand chief, cried like a child, because the sailors spoilt his favourite cloak by powdering it with flour§. It is

* Reise, vol. i. p. 381.
† Arctic Expedition, vol. ii. p. 23.
‡ Cook's First Voyage, p. 103.
§ D'Urville, vol. ii. p. 398. See also Burton's Lake Regions of Central Africa, p. 332.

not, says Cook, "indeed strange that the sorrows of these artless people should be transient, any more than that their passions should be suddenly and strongly expressed; what they feel they have never been taught either to disguise or suppress, and having no habits of thinking which perpetually recall the past, and anticipate the future, they are affected by all the changes of the passing hour, and reflect the colour of the time, however frequently it may vary; they have no project which is to be pursued from day to day, the subject of unremitted anxiety and solicitude, that first rushes into the mind when they awake in the morning, and is last dismissed when they sleep at night. Yet if we admit that they are upon the whole happier than we, we must admit that the child is happier than the man, and that we are losers by the perfection of our nature, the increase of our knowledge, and the enlargement of our views."

We know the difficulty which children find in pronouncing certain sounds: *r* and *l*, for instance, they constantly confound. This is the case also among the Sandwich Islanders and in the Ladrones according to Freycinet*; in Vanikoro†; among the Dammaras‡; and in the Tonga Islands§. Mr. Darwin observed that the Fuegians had great difficulty in comprehending an alternative: and every one must have noticed the tendency among savages to form words by reduplication. This also is characteristic of childhood among civilized races.

Again, some of the most brutal acts which have been recorded against them are to be regarded less as instances of deliberate cruelty, than of a childish thoughtlessness and impulsiveness. A striking instance of this is recorded by Byron in his narrative of the Loss of the Wager. A cacique of the

* Vol. ii. pp. 260. 519.
† Vol. v. p. 218.
‡ Galton, Tropical South Africa, p. 181.
§ Mariner's Tonga Islands, vol. i. p. 30.

Chonos, who was nominally a Christian, had been out with his wife to fish for sea-eggs, and having had little success, returned in a bad humour. "A little boy of theirs, about three years old, whom they appeared to be doatingly fond of, watching for his father and mother's return, ran into the surf to meet them: the father handed a basket of eggs to the child, which being too heavy for him to carry, he let it fall, upon which the father jumped out of the canoe, and catching the boy up in his arms, dashed him with the utmost violence against the stones. The poor little creature lay motionless and bleeding, and in that condition was taken up by the mother, but died soon after*."

In fact, we may fairly sum up this part of the question in a few words by saying, as the most general conclusion which can be arrived at, that savages have the character of children with the passions and strength of men. No doubt different races of savages differ very much in character. An Esquimaux and a Feegeean, for instance, have little in common. But after making every possible allowance for savages, it must I think be admitted that they are inferior, morally as well as in other respects, to the more civilized races. There is indeed no atrocious crime, no vice recorded by any traveller, which might not be paralleled in Europe. But that which is with us the exception, is with them the rule; that which with us is condemned by the general verdict of society, and is confined to the uneducated and the vicious, is among savages passed over almost without condemnation and treated as a mere matter of course. In Tahiti, for instance, the Missionaries considered that "not less than two-thirds of the children were murdered by their parents."

If we now turn to the mental differences between civilized and uncivilized races, we shall find them very strongly

* Byron's Loss of the Wager. Kerr's Voyages, vol. xvii. p. 374.

marked. Speaking of a Bushman tribe, Burchell observes that "whether capable of reflection or not, these individuals never exerted it*." The Rev. T. Dove describes the Tasmanians as distinguished "by the absence of all moral views and impressions. Every idea bearing on our origin and destination as rational beings seems to have been erased from their breasts†." It would be easy to fill a volume with the evidence of excessive stupidity recorded by different travellers. It may be perhaps thought that these were rather instances of individual dulness, than any indication of a national characteristic; but in the nature and capacity of a language we find a test and measure of the higher minds in a nation. Unfortunately, however, travellers have found it difficult enough to obtain vocabularies of the words in use; and it is far less easy to collect information as to those which they do not possess. Yet there are not a few cases in which this has been done. I have already mentioned the deficiency of some North American languages in terms of endearment; this fact suggests a melancholy condition of the domestic relations, but it may here be referred to again as an evidence of a low mental, as well as moral, condition. What Spix and Martius tell us about the Brazilian tribes‡ appears also to be true of many, if not of most, savage races. Their vocabulary is rich, and they have separate names for the different parts of the body, for all the different animals and plants with which they are acquainted; for every thing, in fact, which they can see and handle. Yet they are entirely deficient in words for abstract ideas; they have no expressions for colour, tone, sex, genus, spirit, etc.

The Abipones have no such words as man, body, place, time, never, ever, every where, etc.; nor such a verb as "to be." They cannot say "I am an Abipon," but only "I

* l. c. vol. i. p. 461.

† Tasmanian Journal of Natural Science, vol. i. p. 249.

‡ Reise in Brazilien, vol. i. p. 385.

Abipon*." The Malay language, also, according to Crawfurd, is very deficient in abstract terms. It contains a word for each colour, but no term for colour itself. The St. Petersburg Bible Society endeavoured some years ago to translate the Lord's Prayer and the Ten Commandments into the language of the Tschuktschi, but "partly from the language being entirely deficient in words to express new and abstract ideas; and partly for want of letters to convey the variety of strange and uncouth sounds of which the language itself consists, the translation was wholly unintelligible†.

So, again, the Tasmanians had no word for a tree, though they had a name for each species; nor could they express "qualities, such as hard, soft, warm, cold, long, short, round, etc.; for 'hard' they would say 'like a stone;' for 'tall' they would say 'long legs,' etc.; and for 'round' they said 'like a ball,' 'like the moon,' and so on‡." According to the missionaries§, Fuegians have "no abstract terms for expressing the truths of our religion;" and among the North American languages "a term sufficiently general to denote an 'oak tree' is exceptional||." Even the comparatively civilized inhabitants of Tahiti had, according to Forster, "no proper words for expressing abstract ideas¶."

The names for numbers are, however, the best, or, at least, the most easily applicable test of mental condition among the lower races of man. We have seen that the Esquimaux can only with difficulty count up to ten, and that some individuals cannot go beyond five. The Abipones** can only express three numbers in proper words. The Dammaras "in practice, whatever they may possess in their language,

* Dobritzhoffer, vol. ii. p. 183.

† Wrangell's Siberia and Polar Sea, p. 121.

‡ Milligan, Proc. Roy. Society, Tasmania, vol. iii. p. 281.

§ The Voice of Pity, vol. x. p. 152.

|| Latham, Varieties of Man, p. 375.

¶ l. c. p. 403.

** Dobritzhoffer, vol. ii. p. 169.

certainly use no numeral greater than three. When they wish to express four, they take to their fingers, which are to them as formidable instruments of calculation as a sliding rule is to an English schoolboy. They puzzle very much after five, because no spare hand remains to grasp and secure the fingers that are required for units*." Mr. Crawfurd, to whom we are indebted for an interesting paper on this subject†, has examined no less than thirty Australian languages, and it appears that none of the tribes in that vast continent can count beyond four. According to Mr. Scott Nind, indeed, the numerals used by the natives of King George's Sound reach up to five; but the last is merely the word "many." The Brazilian Indians also count only up to three; for any higher number they use the word "many‡." The Cape Yorkers (Australia) can hardly be said to go beyond two; their numerals are as follows:—

One	*Netat.*
Two	*Naes.*
Three	*Naes-netat.*
Four	*Naes-naes.*
Five	*Naes-naes-netat.*
Six	*Naes-naes-naes.*

Again, in the state of their religious conceptions, still more in the absence of religious conceptions, we get another proof of extreme mental inferiority. The question has been frequently discussed whether there is any race of men so degraded as to be entirely without a religion—without some idea of a deity. The conclusion to be arrived at depends, as it seems to me, very much on the meaning which we ascribe to the term "religion." If a mere fear of the unknown, if a more or less vague belief in witchcraft is to be regarded as a religion, it would, I think, be difficult to refute this assertion.

* Galton's Tropical Africa, p. 133.

† Ethnological Society's Transactions, New Series, vol. ii. p. 84.

‡ Spix and Martius, vol. i. p. 387.

But if a higher estimate of religion is adopted, then so far from this being true, the very reverse is the case. Many, we might almost say all, of the most savage races are, according to the nearly universal testimony of travellers, in this condition.

According to Spix and Martius*, Bates, and Wallace, some of the Brazilian Indians were entirely without religion. Burmeister confirms this statement, and, in the list of the principal tribes of the valley of the Amazons, published by the Hakluyt Society, the Chunchos are stated "to have no religion whatever," and we are told that the Curetus "have no idea of a Supreme Being." The Toupinambas of Brazil had no religion. The South American Indians of the Gran Chaco are said by the missionaries to have "no religious or idolatrous belief or worship whatever; neither do they possess any idea of God, or of a Supreme Being. They make no distinction between right and wrong, and have, therefore, neither fear nor hope of any present or future punishment or reward, nor any mysterious terror of some supernatural power, whom they might seek to assuage by sacrifices or superstitious rites†." Bates‡ tells us "that none of the tribes on the Upper Amazons have an idea of a Supreme Being, and consequently have no word to express it in their languages." Azara also makes the same statement as regards many of the South American tribes visited by him §.

Father Baegert, who lived as a missionary among the Indians of California for seventeen years, affirms that "idols, temples, religious worship, or ceremonies, were unknown to them, and they neither believed in the true and only God, nor adored false deities ||;" and M. de la Perouse also says

* Reise in Brasilien, vol. i. p. 379.

† Voice of Pity, vol. ix. p. 220.

‡ Life in the Amazons, vol. ii. p. 162.

§ Voyages dans l'Amer. Mérid. vol. ii. pp. 3. 14. 33. 51. 60. 76. 80, 81. 84. 90. 138. 160. 164. 166.

|| See Mr. Rau's translation. Smithsonian Contrib. 1863-64, p. 390.

that they "had no knowledge of a God, or of a future state." Colden, who had ample means of judging, assures us that the celebrated "five nations" of Canada "had no public worship nor any word for God," and Hearne, who lived amongst the Northern American Indians for years, and was perfectly acquainted with their habits and language, says the same of some tribes on Hudson's Bay.

In the Voyage de l'Astrolabe, it is stated that the natives of the Samoan and Solomon Islands, in the Pacific, had no religion, and in the voyage of the Novara the same is said of the Caroline Islanders. The Samoans "have neither moraes, nor temples, nor altars, nor offerings, and consequently none of the sanguinary rites, observed at the other groups. In consequence of this the Samoans were considered an impious race; and their impiety became proverbial with the people of Rarotonga, for, when upbraiding a person who neglected the worship of the gods, they would call him "a godless Samoan*." On Damood Island, between Australia and New Guinea, Jukes could find no "traces of any religious belief or observance†." Duradawan, a sepoy who lived some time with the Andaman Islanders, maintained that they had no religion, and Dr. Mouatt believes his statements to be correct ‡. Some of the Australian tribes also are said to have no religion §. In the Pellew Islands, Wilson found no religious buildings, nor any sign of religion.

Mr. Wallace, who had excellent opportunities for judging, and whose merits as an observer no one can question, tells us that among the people of Wanumbai, in the Aru Islands, he could find no trace of a religion ‖; adding, however, that he was but a short time among them.

* Missionary Enterprises, p. 464.

† Jukes, Voyage of the "Fly," vol. i. p. 164.

‡ Trans. Ethn. Soc. vol. ii. p. 45.

§ Collins' English Colony in New South Wales, p. 354.

‖ The Malayan Archipelago, vol. ii. p. 280.

The Yenadies and the Villees, according to Dr. Shortt, are entirely without any belief in a future state *; and again, Hooker tells us that the Lepchas of Northern India have no religion. Captain Grant could find "no distinct form of religion" in some of the comparatively civilized tribes visited by him †. According to Burchell, the Bachapins (Caffres) had no form of worship or religion ‡. They thought "that every thing made itself, and that trees and herbage grew by their own will." They had no belief in a good deity, but some vague idea of an evil being. Indeed the first idea of a god is almost always as an evil spirit.

Speaking of the Foulahs of Wassoulo, in Central Africa, Caillié states, "I tried to discover whether they had any religion of their own; whether they worshipped fetishes, or the sun, moon, or stars; but I could never perceive any religious ceremony amongst them §." Again, he says of the Bambaras that, "like the people of Wassoulo, they have no religion ||," adding, however, that they have great faith in charms.

Burton also states that some of the tribes in the Lake districts of central Africa "admit neither God, nor angel, nor devil ¶." Speaking of Hottentots, Le Vaillant says **: "Je n'y ai vu aucune trace de réligion, rien qui approche même de l'idée d'un être vengeur et rémunérateur. J'ai vécu assez longtemps avec eux, chez eux aux sein de leurs déserts paisibles; j'ai fait, avec ces braves humains, des voyages dans des régions fort eloignées; nulle part je n'ai rencontré rien qui ressemble à la religion." Livingstone

* Proceedings of Madras Government, Revenue Department. May, 1864.

† A Walk across Africa, p. 145.

‡ Travels in South Africa, vol. ii. p. 550.

§ Travels to Timbuctoo, vol. i. p. 303.

|| l. c. p. 375.

¶ Trans. Ethn. Soc. New Ser. vol. i. p. 323.

** Voyages dans l'Afrique, vol. i. p. 93.

mentions that, on one occasion, after talking to a Bushman for some time, as he supposed, about the Deity, he found that the savage thought he was speaking about Sekomi, the principal chief of the district.

Speaking of the Esquimaux, Ross says: "Ervick, being the senior of the first party that came on board, was judged to be the most proper person to question on the subject of religion. I directed Sacheuse to ask him, if he had any knowledge of a Supreme Being; but after trying every word used in his own language to express it, he could not make him understand what he meant. It was distinctly ascertained that he did not worship the sun, moon, stars, or any image or living creature. When asked what the sun or moon was for, he said to give light. He had no knowledge, or idea, how he came into being, or of a future state; but said that when he died he would be put into the ground. Having fully ascertained that he had no idea of a beneficent Supreme Being, I proceeded, through Sacheuse, to inquire if he believed in an evil spirit; but he could not be made to understand what it meant. . . . . .
He was positive that in this incantation he did not receive assistance from any thing, nor could he be made to understand what a good or an evil spirit meant *."

In some cases travellers have arrived at these views very much to their own astonishment. Thus Father Dobritzhoffer says, "Theologians agree in denying that any man in possession of his reason can, without a crime, remain ignorant of God for any length of time. This opinion I warmly defended in the University of Cordoba, where I finished the four years' course of theology begun at Gratz, in Styria. But what was my astonishment, when, on removing from thence to a colony of Abipones, I found that the whole language of these savages does not contain a single word which expresses

* Ross' Voyage of Discovery to the Arctic Regions, p. 127.

God or a divinity. To instruct them in religion, it was necessary to borrow the Spanish word for God, and insert into the catechism 'Dios ecnam caogerik,' 'God the creator of things*.'"

We have already observed a case of this kind in Kolben, who, in spite of the assertions of the natives themselves, felt quite sure that certain dances must be of a religious character, "let the Hottentots say what they will." Again, Mr. Matthews, who went out to act as missionary among the Fuegians, but was soon obliged to abandon the hopeless task, observed only one act "which could be supposed devotional." He sometimes, we are told, "heard a great howling or lamentation, about sunrise in the morning; and upon asking Jemmy Button what occasioned the outcry, he could obtain no satisfactory answer; the boy only saying, 'People very sad, cry very much.'" This appears so natural and sufficient an explanation, that why the outcry should be "supposed devotional," I must confess myself unable to see. Once more, Dr. Hooker states, that the Khasias, an Indian tribe, had no religion. Col. Yule†, on the contrary, says that they have, but he admits that breaking hen's eggs is "the principal part of their religious practice." But if most travellers have expected to find a religion every where, and have been convinced, almost against their will, that the reverse is the case; it is quite possible that there may have been others who have too hastily denied the existence of a religion among the tribes they visited. However this may be, those who assert that even the lowest savages believe in a Supreme Deity, affirm that which is entirely contrary to the evidence. The direct testimony of travellers on this point is indirectly corroborated by their other statements. How, for instance, can a people who are unable to count their own fingers, possibly

* l. c. vol. ii. p. 57. See also p. 64.

† Yule, On the Khasia Hills and People, p. 18.

raise their mind so far as to admit even the rudiments of a religion*? Fetich worship, which is so widely prevalent in Africa, can hardly be called a religion; and even the South Sea Islanders, who were in many respects so highly civilized, are said to have been seriously offended with their deity if they thought that he treated them with undue severity, or without proper consideration. According to Kotzebue, the Kamtschatkans adored their deities "when their wishes were fulfilled, and insulted them when their affairs went amiss†." When the missionaries introduced a printing-press into Feegee "the heathen at once declared it to be a god‡."

The natives of the Nicobar Islands put up scarecrows to frighten away the deity§, and Burton once heard an old Ecsa woman, who was suffering from tooth-ache, offer up the following prayer: "Oh Allah, may thy teeth ache like mine; Oh Allah, may thy gums be as sore as mine are now."

The savage is, however, almost universally a believer in witchcraft. Confusing together subjective and objective relations, he is a prey to constant fears. Nor is the belief in sorcery easily shaken off even by the most civilized nations. James the First was under the impression that by melting little images of wax "the persons that they bear the name of may be continually melted or dried away by continual sickness." As regards pictures, the most curious fancies exist among savage races. They have a very general dislike to be represented, thinking that the artist thereby acquires some mysterious power over them. Kane on one occasion freed himself from some importunate Indians, by threatening

* See, for instance, Greg's Creed of Christendom, p. 212.

† New Voyage round the World, vol. ii. p. 13.

‡ Figi and the Figians, vol. ii. p. 222.

§ Voyage of the "Novara," vol. ii. p. 66.

to draw them if they did not go away. I have already mentioned (p. 529) the danger in which Catlin found himself from sketching a chief in profile, and thereby, as it was supposed, depriving him of half his face. So again a mysterious connexion is supposed to exist between a cut lock of hair and the person to whom it belonged. In various parts of the world the sorcerer gets clippings of the hair of his enemy, parings of his nails, or leavings of his food, convinced that whatever evil is done to these will react on their former owner. Even a piece of clothing, or the ground on which a person has trodden, will answer the purpose, and among some tribes the mere knowledge of a person's name is supposed to give a mysterious power. The Indians of British Columbia have a great horror of telling their names. Among the Algonquins a person's real name is communicated only to his nearest relations and dearest friends: the outer world address him by a kind of nickname. Thus the true name of La Belle Sauvage was not Pocahontas, but Matokes, which they were afraid to communicate to the English. In some tribes these name-fancies take a different form. According to Ward, it is an unpardonable sin for a Hindoo woman to mention the name of her husband. The Kaffirs have a similar custom, and so have some East African tribes. In many parts of the world the names of the dead are avoided with superstitious horror. This is the case in great parts of North and South America, in Siberia, among the Papuans and Australians, and even in Shetland, where it is said that widows are very reluctant to mention their departed husbands.

Throughout Australia, among some of the Brazilian tribes, in parts of Africa, and in various other countries, natural death is regarded as an impossibility. In the New Hebrides "when a man fell ill, he knew that some sorcerer was burning his rubbish; and shell-trumpets, which could be heard

for miles, were blown to signal to the sorcerers to stop, and wait for the presents which would be sent next morning. Night after night, Mr. Turner used to hear the melancholy too-tooing of the shells, entreating the wizards to stop plaguing their victims*." Savages never know but what they may be placing themselves in the power of these terrible enemies†, and it is not too much to say that the horrible dread of unknown evil hangs like a thick cloud over savage life, and embitters every pleasure.

The mental sufferings which they thus undergo, the horrible tortures which they sometimes inflict on themselves, and the crimes which they are led to commit, are melancholy in the extreme. It must not be supposed that in the preceding chapter I have selected from various works all the passages most unfavourable to savages, and that the picture I have drawn of them is unfair. In reality the very reverse is the case. Their real condition is even worse and more abject than that which I have endeavoured to depict. I have been careful to quote only from trustworthy authorities, but there are many things stated by them which I have not ventured to repeat; and there are other facts which the travellers themselves were ashamed to publish.

* Tylor, l. c. p. 129; Turner's Polynesia, pp. 18. 89. 424.

† See Brown, New Zealand and its Aborigines, p. 80.

CHAPTER XVI.

CONCLUDING REMARKS.

I HAVE already expressed my belief that the simpler arts and implements have been independently invented by various tribes, at different times, and in different parts of the world. Even at the present day we may, I think, obtain glimpses of the manner in which they were, or may have been, invented. Elephants break off boughs and use them as fans. Monkeys use clubs, and throw sticks and stones at those who intrude upon them. They also use round stones for cracking nuts, and surely a very small step would lead from that to the application of a sharp stone for cutting. When the edge became blunt, it would be thrown away, and another chosen; but after a while, accident, if not reflection, would show, that a round stone would crack other stones, as well as nuts, and thus the savage would learn to make sharp-edged stones for himself. At first, as we see in the drift specimens, these would be coarse and rough, but gradually the pieces chipped off would become smaller, the blows would be more cautiously and thoughtfully given, and at length it would be found that better work might be done by pressure than by blows. From pressure to polishing would again be but a small step. In making flint implements sparks would be produced; in polishing them it would not fail to be observed that they became hot, and in this

way it is easy to see how the two methods of obtaining fire may have originated*.

The chimpanzee builds himself a house or resting-place, quite equal to that of some savages. Our earliest ancestors therefore may have had this art; but even if not, when they became hunters, and, as we find to be the case with all hunting tribes, supplemented the inefficiency of their weapons by an intimate acquaintance with the manners and customs of the animals on which they preyed, they could not fail to observe, and perhaps to copy, the houses which various species of animals construct for themselves.

The Esquimaux have no pottery; they use hollow stones as a substitute, but we have seen how they sometimes improve upon these by a rim of clay. To extend this rim, diminish, and at last replace the stone, is an obvious process. In hotter countries, vessels of wood, or the shells of fruit, such as cocoa-nuts and gourds, are used for holding liquids. These will not stand fire, but in some cases, by plastering them on the outside with clay, they are enabled to do so. There is some evidence that this obvious improvement has been made by several separate tribes even in modern times. Other similar cases might be mentioned, in which by a very simple and apparently obvious process, an important improvement is secured. It seems very improbable that any such advantage should ever be lost again. There is no evidence, says Mr. Tylor†, "of any tribe giving up the use of the spindle to twist their thread by hand, or having been in the habit of working the fire-drill with a thong, and going back to the clumsier practice of working it without, and it is even hard to fancy such a thing happening." What follows from this argument? Evidently that the lowest races of

* The idea of using fire would also have been suggested by volcanoes, by trees set on fire by lightning, and by the natural fires which occur in hot summers.

† l. c. p. 364.

existing savages must, always assuming the common origin of the human race, be at least as far advanced as were our ancestors when they spread over the earth's surface.

What, then, must have been their condition? They were ignorant of pottery, for the Esquimaux, the Polynesians, the Australians, some North and South American tribes, and many other savage races, have none even now, or at least had none until quite lately. They had no bows and arrows, for these weapons were unknown to the Australians and New Zealanders; their boats for the same reason must have been of the rudest possible character; they were naked, and ignorant of the art of spinning; they had no knowledge of agriculture, and probably no domestic animal but the dog, though here the argument is weaker, inasmuch as experience is more portable than property. It is, however, in my opinion, most probable that the dog was long the only domesticated animal. Of the more unusual weapons, such as the boomerang, blowpipe, bolas, etc., they were certainly ignorant. The sling and the throwing-stick were doubtless unknown, and even the shield, as it is only used in war, had probably not been invented. The spear, which is but a development of the knife-point, and the club, which is but a long hammer, are the only things left by this line of argument. They seem to be the only natural and universal weapons of man.

We might be disposed to wonder how man was at first able to kill game; but we must remember that if man was unskilful, animals were unsuspicious. The tameness of the birds on uninhabited islands is well known; the wariness of animals and the skill of man must have increased almost *pari passu.*

The same argument may be applied to the mental condition of savages. That our earliest ancestors could have counted to ten is very improbable, considering that so many

races now in existence cannot get beyond four. On the other hand, it is very improbable that man can have existed in a lower condition than that thus indicated. So long, indeed, as he was confined to the tropics, he may have found a succession of fruits, and have lived as the monkeys do now. Indeed, according to Bates, this is still the case with some of the Brazilian Indians. "The monkeys," he says, "lead in fact a life similar to that of the Parárauate Indians." Directly, however, our ancestors spread into temperate climates, this mode of life would become impossible, and they would be compelled to seek their nourishment, in part at least, from the animal kingdom. Then, if not before, the knife and the hammer would develope into the spear and the club.

It is too often supposed that the world was peopled by a series of "migrations." But migrations, properly so called, are compatible only with a comparatively high state of organization. Moreover, it has been observed that the geographical distribution of the various races of Man curiously coincides with that of other races of animals: and there can be no doubt that he originally crept over the earth's surface, little by little, year by year, just for instance as the weeds of Europe are now gradually but surely creeping over the surface of Australia.

The preceding argument assumes, of course, the unity of the human race. It would, however, be impossible for me to end this volume without saying a few words on this great question. It must be admitted that the principal varieties of mankind are of great antiquity. We find on the earliest Egyptian monuments, some of which are certainly as ancient as 2400 B.C., "two great distinct types, the Arab on the east and west of Egypt, the Negro on the south; and the Egyptian type occupying a middle place between the two. The representations of the monuments, although conven-

tional, are so extremely characteristic that it is quite impossible to mistake them." These distinct types still predominate in Egypt and the neighbouring countries. Thus, then, says Mr. Poole, in this immense interval we do not find "the least change in the Negro or the Arab; and even the type which seems to be intermediate between them is virtually as unaltered. Those who consider that length of time can change a type of man, will do well to consider the fact that three thousand years give no ratio on which a calculation could be founded*." I am, however, not aware that it is supposed by any school of Ethnologists that "time" alone, without a change of external conditions, will produce an alteration of type. Let us turn now to the instances relied on by Mr. Crawfurd†. The millions, he says, "of African Negroes that have during three centuries been transported to the New World and its islands, are the same in colour as the present inhabitants of the parent country of their forefathers. The Creole Spaniards, who have for at least as long a time been settled in tropical America, are as fair as the people of Arragon and Andalusia, with the same variety of colour in the hair and eye as their progenitors. The pure Dutch Creole colonists of the Cape of Good Hope, after dwelling two centuries among black Caffres, and yellow Hottentots, do not differ in colour from the people of Holland." Here, on the contrary, we have great change of circumstances, but a very insufficient lapse of time, and in fact there is no well-authenticated case in which these two requisites are united. But Mr. Crawfurd went, I think, too far when he denied altogether any change of type. In spite of the comparatively short time which has elapsed, and of the immense immigration which has been kept up, there is already a marked difference between the English of Europe

* Poole, Trans. Ethn. Soc. New Ser. vol. ii. p. 261.

† Crawfurd, Trans. Ethn. Soc. New Ser. vol. ii. p. 252.

and those of America, and it would be desirable to inquire whether, in their own eyes, the Negroes of the New World exactly resemble those of Africa.

But there are some reasons which make it probable that changes of external condition, or rather of country, produce less effect now than was formerly the case. At present, when men migrate they carry with them the manners and appliances of civilized life. They build houses more or less like those to which they have been accustomed, carry with them flocks and herds, and introduce into their new country the principal plants which served them for food in the old. If their new abode is cold they increase their clothing, if warm, they diminish it. In these and a hundred other ways the effect which would otherwise be produced is greatly diminished.

But, as we have seen, this has not always been the case. When man first spread over the earth, he had no domestic animals, perhaps not even the dog; no knowledge of agriculture: his weapons were of the rudest character, and his houses scarcely worthy of the name. His food, habits, and whole manner of life must then have varied as he passed from one country to another; he must have been far more subject to the influence of external circumstances, and in all probability more susceptible of change. Moreover, his form, which is now stereotyped by long ages of repetition, may reasonably be supposed to have been itself more plastic than is now the case.

If there is any truth in this view of the subject, it will necessarily follow that the principal varieties of man are of great antiquity, and in fact go back almost to the very origin of the human race. We may then cease to wonder that the earliest paintings on Egyptian tombs represent so accurately several varieties still existing in those regions, and that the Engis skull, probably the most ancient yet found in Europe,

so closely resembles many that may be seen even at the present day.

This argument has been carried still farther by Mr. Wallace in an admirable memoir on "The Origin of Human Races and the Antiquity of Man deduced from the Theory of Natural Selection*." He has attempted to reconcile the two great schools of ethnologists who hold opinions "so diametrically opposed to each other; the one party positively maintaining that man is a species, and is essentially one—that all differences are but local and temporary variations, produced by the different physical and moral conditions by which he is surrounded; the other party maintaining with equal confidence that man is a genus of many species, each of which is practically unchangeable, and has ever been as distinct, or even more distinct, than we now behold them." Mr. Wallace himself holds the former of these theories, although admitting that at present apparently "the best of the argument is on the side of those who maintain the primitive diversity of man," and he shows that the true solution of this difficulty lies in the theory of Natural Selection, which, with characteristic unselfishness, he ascribes unreservedly to Mr. Darwin, although, as is well known, he struck out the idea independently and published it, not indeed with the same elaboration, at the same time.

After explaining the true nature of the theory, which it must be confessed, is even yet very much misunderstood, he points out that as long as man led what may be called a mere animal existence, he would be subject to the same laws, and would vary in the same manner as the rest of his fellow-creatures, but that at length "by the capacity of clothing himself, and making weapons and tools (he) has taken away from nature that power of changing the external form and structure which she exercises over all other animals. . . . .

* Anthropological Review, May, 1864.

From the time, then, when the social and sympathetic feelings came into active operation, and the intellectual and moral faculties became fairly developed, man would cease to be influenced by natural selection in his physical form and structure; as an animal he would remain almost stationary: the changes of the surrounding universe would cease to have upon him that powerful modifying effect which it exercises over other parts of the organic world. But from the moment that his body became stationary, his mind would become subject to those very influences from which his body had escaped; every slight variation in his mental and moral nature which should enable him better to guard against adverse circumstances, and combine for mutual comfort and protection, would be preserved and accumulated; the better and higher specimens of our race would therefore increase and spread, the lower and more brutal would give way and successively die out, and that rapid advancement of mental organization would occur, which has raised the very lowest races of men so far above the brutes (although differing so little from some of them in physical structure), and, in conjunction with scarcely perceptible modifications of form, has developed the wonderful intellect of the Germanic races*."

Mr. Wallace appears to me, however, to press his argument a little too far when he says that man is no longer "influenced by natural selection," and that his body has "become stationary." Slow and gradual changes still take place, although his "mere bodily structure" long ago became of less importance to man than "that subtle force we term mind." This, as Mr. Wallace eloquently says, "with a naked and unprotected body, *this* gave him clothing against

* M. Lartet has attempted to show that even among animals there is a gradual enlargement of the brain as compared with the rest of the body. Comptes Rendus, 1868, p. 1119.

the varying inclemencies of the seasons. Though unable to compete with the deer in swiftness, or with the wild bull in strength, *this* gave him weapons wherewith to capture or overcome both. Though less capable than most other animals of living on the herbs and the fruits that unaided nature supplies, this wonderful faculty taught him to govern and direct nature to his own benefit, and make her produce food for him when and where he pleased. From the moment when the first skin was used as a covering, when the first rude spear was formed to assist in the chase, the first seed sown or shoot planted, a grand revolution was effected in nature, a revolution which in all the previous ages of the world's history had had no parallel, for a being had arisen who was no longer necessarily subject to change with the changing universe,—a being who was in some degree superior to nature, inasmuch as he knew how to control and regulate her action, and could keep himself in harmony with her, not by a change in body, but by an advance in mind.

"Here, then, we see the true grandeur and dignity of man. On this view of his special attributes, we may admit that even those who claim for him a position and an order, a class, or a sub-kingdom by himself, have some reason on their side. He is, indeed, a being apart, since he is not influenced by the great laws which irresistibly modify all other organic beings. Nay, more: this victory which he has gained for himself gives him a directing influence over other existences. Man has not only escaped 'natural selection' himself, but he is actually able to take away some of that power from nature which, before his appearance, she universally exercised. We can anticipate the time when the earth will produce only cultivated plants and domestic animals; when man's selection shall have supplanted 'natural selection;' and when the ocean will be the only domain in

which that power can be exerted, which for countless cycles of ages ruled supreme over the earth."

Thus, then, the great principle of Natural Selection, which is to biology what the law of gravitation is for astronomy, not only throws an unexpected light on the past, but illuminates the future with hope; nor can I but feel surprised that a theory which thus teaches us humility for the past, faith in the present, and hope for the future, should have been regarded as opposed to the principles of Christianity or the interests of true religion.

But even if the theory of "natural selection" should eventually prove to be untenable, and if those are right who believe that neither our minds nor our bodies are susceptible of any important change, any great improvement, still I think we are justified in believing that the happiness of man is greatly on the increase. It is generally admitted that if any animal increases in numbers it must be because the conditions are becoming more favourable to it, in other words, because it is happier and more comfortable. Now, how will this test apply to man? Schoolcraft estimates* that in a population which lives on the produce of the chase, each hunter requires on an average 50,000 acres, or 78 square miles for his support. Again, he tells us† that, excluding Michigan territory, west of Lake Michigan, and north of Illinois, there were in the United States, in 1825, about 97,000 Indians, occupying 77,000,000 of acres, or 120,312 square miles. This gives one inhabitant to every $1\frac{1}{4}$ square miles. In this case, however, the Indians lived partly on the subsidies granted them by Government in exchange for land, and the population was therefore greater than would have been the case if they had lived entirely on the produce of the chase. The same reason affects, though to a smaller extent, the Indians in the Hudson's Bay territory. These

* Indian Tribes, vol. i. p. 433. † l. c. vol. iii. p. 575.

tribes were estimated by Sir George Simpson, late Governor of the territories belonging to the Hudson's Bay Company, in his evidence given before the Committee of the House of Commons, in 1857, at 139,000, and the extent is supposed to be more than 1,400,000 square miles, to which we must add 13,000 more for Vancouver's Island, making a total of more than 900,000,000 of acres; about 6500 acres, or 10 square miles, to each individual. Again, the inhabitants of Patagonia, south of 40°, and exclusive of Chiloe and Tierra del Fuego, are estimated by Admiral Fitzroy at less than 4000, and the number of acres is 176,640,000, giving more than 44,000 acres, or 68 square miles for each *person*. A writer in the "Voice of Pity," however, thinks that their numbers may, perhaps, amount to 14,000 or 15,000*. It would be difficult to form any census of the aborigines in Australia; Mr. Oldfield estimates that there is one native to every fifty square miles†; and it is at least evident that, since the introduction of civilization, the total population of that continent has greatly increased.

Indeed, population as a general rule increases with civilization. Paraguay, with 100,000 square miles, has from 300,000 to 500,000 inhabitants, or about four to a square mile. The uncivilized parts of Mexico contained 374,000 inhabitants in 675,000 square miles; while Mexico proper, with 833,600 square miles, had 6,691,000 inhabitants. Naples had more than 183 inhabitants to each square mile; Venetia more than 200, Lombardy 280, England 280, Belgium as many as 320.

Finally, we cannot but observe that, under civilization, the means of subsistence have increased, even more rapidly than the population. Far from suffering for want of food, the more densely peopled countries are exactly those in which it is, not only absolutely, but even relatively most

* l. c. vol. ii. p. 93. † Trans. Ethn. Soc. New Ser. vol. iii. p. 220.

abundant. It is said that any one who makes two blades of grass grow where one grew before, is a benefactor to the human race; what, then, shall we say of that which enables a thousand men to live in plenty, where one savage could scarcely find a scanty and precarious subsistence?

There are, indeed, many who doubt whether happiness is increased by civilization, and who talk of the free and noble savage. But the true savage is neither free nor noble; he is a slave to his own wants, his own passions; imperfectly protected from the weather, he suffers from the cold by night and the heat of the sun by day; ignorant of agriculture, living by the chase, and improvident in success, hunger always stares him in the face, and often drives him to the dreadful alternative of cannibalism or death.

Wild animals are always in danger. Mr. Galton, who is so well qualified to form an opinion, believes that the life of all beasts in their wild state is an exceedingly anxious one; that "every antelope in South Africa has literally to run for its life once in every one or two days upon an average, and that he starts or gallops under the influence of a false alarm many times in a day *." So it is with the savage; he is always suspicious, always in danger, always on the watch. He can depend on no one, and no one can depend upon him. He expects nothing from his neighbour, and does unto others as he believes that they would do unto him. Thus his life is one prolonged scene of selfishness and fear. Even in his religion, if he has any, he creates for himself a new source of terror, and peoples the world with invisible enemies. The position of the female savage is even more wretched than that of her master. She not only shares his sufferings, but has to bear his ill-humour and ill-usage. She may truly be said to be little better than his dog, little dearer than his horse. In Australia, Mr. Oldfield never saw a woman's

* Trans. Ethn. Soc. New Ser. vol. iii. p. 133.

grave, and does not think that the natives took the trouble to bury them. But, indeed, he believes that few of them are so fortunate as to die a natural death, "they being generally despatched ere they become old and emaciated, that so much good food may not be lost. . . . . In fine, so little importance is attached to them, either before or after death, that it may be doubted whether the man does not value his dog, when alive, quite as much as he does his woman, and think of both quite as often and lovingly after he has eaten them*."

Not content, moreover, with those incident to their mode of life, savages appear to take a melancholy pleasure in self-inflicted sufferings. Besides the very general practice of tattooing, the most extraordinary methods of disfigurement and self-torture are adopted; some cut off the little finger, some make an immense hole in the under-lip, or pierce the cartilage of the nose. The Easter Islanders enlarge their ears till they come down to their shoulders; the Chinooks, and many other American tribes, alter the shape of their heads. Some of the African tribes chip their teeth in various manners, each community having a fashion of its own. The Nyambanas, a division of the Caffres, are characterized by a row of artificial pimples or warts, about the size of a pea, and extending from the upper part of the forehead to the tip of the nose. Of these they are very proud†. Among the Bachapins, those who have distinguished themselves in battle, are allowed the privilege of marking "their thigh with a long scar, which is rendered indelible and of a bluish colour by means of wood ashes rubbed into the fresh wound‡." In Australia Captain King saw a native ornamented with horizontal scars which extended across the upper part of the chest. They were at least

* Trans. Ethn. Soc. New Ser. vol. iii. p. 248.

† United States' Exploring Expedition, vol. i. p. 63.

‡ Burchell, l. c. vol. ii. pp. 478. 535.

an inch in diameter, and protruded half an inch from the body*. In some parts of Australia, and in Tasmania, all the men have a tooth knocked out in a very clumsy and painful manner†. "The inhabitants of Tanna have on their arms and bellies elevated scars, representing plants, flowers, stars and various other figures. They are made by first cutting the skin with a sharp bamboo reed, and then applying a certain plant to the wound which raises the scar above the rest of the skin. The inhabitants of Tazavan, or Formosa, by a very painful operation, impress on their naked skins various figures of trees, flowers, and animals. The great men in Guinea have their skin flowered like damask; and in the Deccan the women likewise have flowers cut into their flesh on the forehead, the arms and the breast, and the elevated scars are painted in colours, and exhibit the appearance of flowered damask‡." The native women in New South Wales used to tie a string tightly round the little finger and wear it until the finger rotted off. Few of them escaped the painful experience§. The American Indians also inflicted the most horrible tortures upon themselves||. These and many other curious practices are none the less painful because they are voluntary.

If we turn to the bright side of the question, the whole analogy of nature justifies us in concluding that the pleasures of civilized man are greater than those of the savage. As we descend in the scale of organization, we find that animals become more and more vegetative in their characteristics; with less susceptibility to pain, and consequently less capacity for happiness. It may, indeed, be doubted whether some of those beings, which from their anatomy we are compelled to class as animals, have much more consciousness of

* Narrative of a Survey of the Intertropical and Western Coasts of Australia, p. 42. See also Eyre's account, quoted in p. 435.

† Freycinet, vol. ii. p. 705.

‡ Forster, l. c. p. 588.

§ D'Urville, vol. i. p. 406.

|| See, for instance, Catlin's North American Indians, vol. i. p. 170. Azara, vol. ii. p. 136.

enjoyment, or even of existence, than a tree or a seaweed. But even to animals which possess a clearly defined nervous system, we must ascribe very different degrees of sensibility. The study of the sensory organs in the lower animals offers great difficulties; but at least we know that they are, in many cases, few in number, and capable of conveying only general impressions. Every one will admit that the possession of a new sense, or the improvement of an old one, is a fresh source of possible happiness; but how, it may be asked, does this affect the present question? There are no just grounds for expecting man to be ever endued with a sixth sense; so far from being able to improve the organization of the eye or the ear, we cannot make one hair black or white, nor add one cubit to our stature. But on the other hand, the invention of the telescope and microscope is equivalent in its results to an immense improvement of the eye, and opens up to us new worlds, fresh sources of interest and happiness. Again we cannot alter the physical structure of the ear, but we can train it, we can invent new musical instruments, compose new melodies. The music of savages is rude and melancholy in comparison with ours; and thus, though the ear of man may not have appreciably altered, the pleasure which we may derive from it has been immensely increased. Moreover, the savage is like a child who sees and hears only that which is brought directly before him, but the civilized man questions nature, and by the various processes of chemistry, by electricity, and magnetism, by a thousand ingenious contrivances, he forces nature to throw light upon herself, discovers hidden uses and unsuspected beauties, almost as if he were endowed with some entirely new organ of sense.

The love of travel is deeply implanted in the human breast; it is an immense pleasure to visit other countries, and see new races of men. Again, the discovery of printing brings all who choose into communion with the greatest

minds. The thoughts of a Shakespeare or a Tennyson, the discoveries of a Newton or a Darwin, become thus the common property of mankind. Already the results of this all-important, though simple, process have been equivalent to an immense improvement of our mental faculties; and day by day, as books become cheaper, schools are established, and education is improved, a greater and greater effect will be produced.

The well-known proverb against looking a gift horse in the mouth does not apply to the gifts of nature; they will bear the closest inspection, and the more we examine, the more we shall find to admire. Nor are these new sources of happiness accompanied by any new liability to suffering; on the contrary, while our pleasures are increased, our pains are lessened; in a thousand ways we can avoid or diminish evils which to our ancestors were great and inevitable. How much misery, for instance, has been spared to the human race by the single discovery of chloroform? The capacity for pain, so far as it can serve as a warning, remains in full force, but the necessity for endurance has been greatly diminished. With increased knowledge of, and attention to, the laws of health, disease will become less and less frequent. Those tendencies thereto which we have derived from our ancestors, will gradually die out; and if fresh seeds are not sown, our race may one day enjoy the inestimable advantages of health.

Thus, then, with the increasing influence of science, we may confidently look to a great improvement in the condition of man. But it may be said that our present sufferings and sorrows arise principally from sin, and that any moral improvement must be due to religion, not to science. This separation of the two mighty agents of improvement is the great misfortune of humanity, and has done more than any thing else to retard the progress of civilization. But even if

for the moment we admit that science will not render us more virtuous, it must certainly make us more innocent. Out of 130,000 persons committed to prison in England and Wales during the year 1867, only 4137 could read and write well. In fact, our criminal population are mere savages, and most of their crimes are but injudicious and desperate attempts to live as a savage in the midst, and at the expense, of a civilized community.

Men do not sin for the sake of sinning; they yield to temptation. Most of our sufferings arise from a mistaken pursuit of pleasure; from a misapprehension of that which constitutes true happiness. Men do wrong either from ignorance or in the hope, unexpressed perhaps even to themselves, that they may enjoy the pleasure, and yet avoid the penalty of sin. In this respect there can be no doubt that religious teaching is much misapprehended. Repentance is too often regarded as a substitute for punishment. Sin it is thought is followed *either* by the one or the other. So far, however, as our world is concerned, this is not the case; repentance may enable a man to avoid sin in future, but has no effect on the consequences of the past. The laws of nature are just, and salutary, but they are also inexorable. All men admit that "the wages of sin is death," but they seem to think that this is a general rule to which there may be many exceptions,—that *some* sins may possibly tend to happiness, that some thorns may grow grapes, some thistles produce figs. That suffering is the inevitable consequence of sin, as surely as night follows day, is, however, the stern yet salutary teaching of Science. And surely if this lesson were thoroughly impressed upon our minds, if we really believed in the certainty of punishment, and that sin could not conduce to happiness; temptation, which is at the very root of crime, would be cut away, and mankind must necessarily become more innocent.

May we not, however, go even farther than this, and say that science will also render man more virtuous. "To pass our time," says Lord Brougham*, "in the study of the sciences, in learning what others have discovered, and in extending the bounds of human knowledge has, in all ages, been reckoned the most dignified and happy of human occupations. . . . . No man until he has studied philosophy, can have a just idea of the great things for which Providence has fitted his understanding; the extraordinary disproportion which there is between his natural strength and the powers of his mind, and the force he derives from them." Finally, he concludes that science would not only "make our lives more agreeable, but better; and that a rational being is bound by every motive of interest and duty, to direct his mind towards pursuits which are found to be the sure path of virtue as well as of happiness."

We are in reality but on the threshold of civilization. Far from showing any indication of having come to an end, the tendency to improvement seems latterly to have proceeded with augmented impetus and accelerated rapidity. Why, then, should we suppose that it must now cease? Man has surely not reached the limits of his intellectual development, and it is certain that he has not exhausted the infinite capabilities of nature. There are many things which are not as yet dreamt of in our philosophy; many discoveries which will immortalize those who make them, and confer upon the human race advantages which as yet, perhaps, we are not in a condition to appreciate. We may still say with our great countryman, Sir Isaac Newton, that we have been but like children, playing on the sea-shore, and picking up here and there a smoother pebble or a prettier shell than ordinary, while the great ocean of truth lies all undiscovered before us.

* Objects, Advantages, and Pleasures of Science, p. 39.

Thus, then, the most sanguine hopes for the future are justified by the whole experience of the past. It is surely unreasonable to suppose that a process which has been going on for so many thousand years, should have now suddenly ceased; and he must be blind indeed who imagines that our civilization is unsusceptible of improvement, or that we ourselves are in the highest state attainable by man.

If we turn from experience to theory, the same conclusion forces itself upon us. The great principle of natural selection, which in animals affects the body and seems to have little influence on the mind, in man affects the mind and has little influence on the body. In the first it tends mainly to the preservation of life; in the second to the improvement of the mind, and consequently to the increase of happiness. It ensures, in the words of Mr. Herbert Spencer, "a constant progress towards a higher degree of skill, intelligence, and self-regulation—a better co-ordination of actions—a more complete life*." Even those, however, who are dissatisfied with the reasoning of Mr. Darwin, and believe that neither our mental nor our material organization is susceptible of any considerable change, may still look forward to the future with hope. The tendency of recent improvements and discoveries is less to effect any rapid change in man himself, than to bring him into harmony with nature; less to confer upon him new powers, than to teach him how to apply the old.

It will, I think, be admitted that of the evils under which we suffer, nearly all may be attributed either to ignorance or sin. That ignorance will be diminished by the progress of science is of course self-evident,—that the same will be the case with sin, seems little less so. Thus, then, both theory and experience point to the same conclusion. The future happiness of our race, which poets hardly ventured to hope

* Herbert Spencer, A Theory of Population deduced from the General Law of Animal Fertility, p. 34.

for, science boldly predicts. Utopia, which we have long looked upon as synonymous with an evident impossibility, which we have ungratefully regarded as "too good to be true," turns out on the contrary to be the necessary consequence of natural laws, and once more we find that the simple truth exceeds the most brilliant flights of the imagination.

Even in our own time we may hope to see some improvement; but the unselfish mind will find its highest gratification in the belief that, whatever may be the case with ourselves, our descendants will understand many things which are hidden from us now, will better appreciate the beautiful world in which we live, avoid much of that suffering to which we are subject, enjoy many blessings of which we are not yet worthy, and escape many of those temptations which we deplore, but cannot wholly resist.

APPENDIX.

Page 11.

We do not yet know at what time the use of Runes commenced. The examples found at Thorsbjerg and Nydam carry them back to the second or third century, but they may have begun much earlier. They remained partially in use in out-of-the-way districts of Scandinavia down to the close of the last century. Runic monuments occur in Norway, Sweden, Denmark, England, and, though rarely, in Ireland; but are more abundant in Sweden than any where else. Prof. Stephens * states that there are three times as many in Sweden as in all other northern countries together, and he estimates the total number in Sweden at not less than two thousand.

The Runic Alphabet, or Futhorc, is as follows:—

ᚠ. ᚢ. ᚦ. ᚨ. ᚱ. ᚴ. ᚼ. ᚾ. ᛁ. ᛅ. ᛋ. ᛏ. ᛒ. ᛚ. ᛘ. ᛦ.
F U th O R K H N I A S T B L M (Œ, Y)

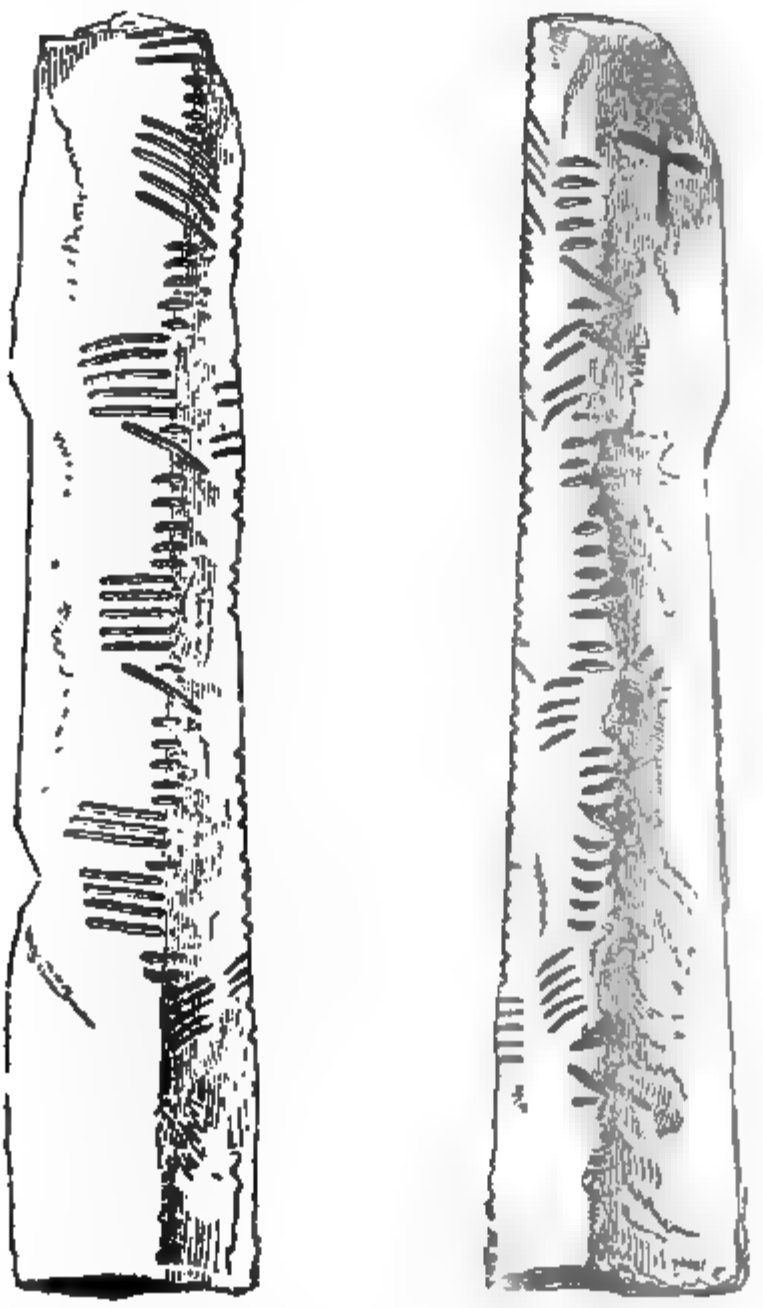
There are, however, several varieties, thus ᚬ. sometimes stands for o, ᛅ. for n, ᛋ. for s, ᛏ. for t, ᛏ. for d, and ᛁ. for e. There is also a class of letters known as tree-runes, which are entirely unlike the rest. The letters given above are those generally used in the engravings on stones in the great tumulus known as Maeshowe, near the Stones of Stennis, in the Orkneys †, and are supposed to have been the work of a party of Northmen who broke into the Howe in the ninth century. The numerous variations in the forms of the letters, and the fact that they are sometimes read from left to right, sometimes from right to left, make them at times somewhat difficult to decipher, but it fortunately happens that we possess no less than 61 Runic Futhorcs, so that any inscription which is at all perfect, and not too much abbreviated, can be read with tolerable certainty.

* The Old-Northern Runic Monuments of Scandinavia, p. 134.
† Maeshowe. By. J. Farrar, Esq., M.P.

OGHAMS.

The origin of the Ogham alphabet is as uncertain as that of the Runic. While, however, the Runes occur principally in Scandinavia, and but rarely in Great Britain, Oghams on the other hand, have their head-quarters in Ireland, though some few have been discovered in Scotland and even in Shetland. They are generally

FIG. 227. FIG. 228.



Ogham Stones found in Kerry.

intended to be read from below upwards, and the letters consist of mere straight strokes, arranged in groups along a line. This line is very often the edge of the stone, but sometimes a line is

cut. In other cases an imaginary line is supposed to run through the inscription. Short lines, or notches, stand for the vowels, a, o, u, e, i; one notch denoting a, two o, three u, and so on. Lines on the left of the base line stand for b, l, f, s, and n, according as they are 1, 2, 3, 4, or 5 in number; lines on the right of the base line stand in the same manner for h, d, t, c, and q; while those crossing the line denote m, g, ng, st, or z, and r. There are some few other characters, which, however, seldom occur.

Almost all the Ogham inscriptions which have yet been read are mere patronymics, containing the name of the person in whose honour the stone was erected. Thus the above figure (fig. 227) of an Ogham stone found in Kerry reads thus : Nocati maqi maqi ret(ti), i. e. (The Stone) of Nocat, the son of Macreith; the inscription on fig. 228 is, Maqi Mucoi Uddami, i. e. (The Stone) of Uddam Mac Mucoi.

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Staigue Fort, in the County of Kerry, is "an enclosure, nearly circular, 114 feet in diameter, 88 feet from east to west, and 87 from north to south. The stones are put together without any description of mortar or cement; the wall is 13 feet thick at the bottom, and 5 feet 2 inches broad at top at the highest part, where some of the old coping stones still remain, and which is there 17 feet 6 inches high upon the inside. It has one square doorway in the s.s.w. side, 5 feet 9 inches high, with sloping sides, 4 feet 2 inches wide at top, and 5 feet at bottom. In the substance of this massive wall, and opening inwards, are two small chambers; the one on the west side is 12 feet long, 4 feet 7 inches wide, and 6 feet 6 inches high; the northern chamber is 7 feet 4 inches long, 4 feet 9 inches wide, and 7 feet high. They formed a part of the original plan, and were not, like other apertures in some similar structures, filled-up gateways. Around the interior of the wall are arranged ten sets of stairs, ... the highest reaching very nearly to the full height of the wall, and the secondary flights being about half that much; each step is 2 feet wide; and the lower flights project within the circle of the higher. They lead to narrow platforms, from 8 to 43 feet in length, on which its wardens or defenders stood." (Catalogue of the Royal Irish Academy, p. 120.)

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On this subject I append three letters, one from Dr. Percy, F.R.S., and the other two from Messrs. Jenkin and Lefeaux, the highly experienced assayers to Messrs. P. Grenfell and Sons :—

November 11, 1868.

MY DEAR SIR JOHN LUBBOCK,

I have paid considerable attention to the subject of ancient bronze, and all the information I have gathered respecting it is directly opposed to Mr. Wibel's view. The remarkable uniformity in the composition of ancient bronze is in itself sufficient to refute that view. When I speak of uniformity, I should add that there is some variation in the composition according to the uses for which bronze implements were intended. Thus, where greater hardness was needed more tin was added. It is impossible to conceive that any thing approximating to uniformity in the composition of ancient bronze could have been produced from the smelting of accidental mixtures of copper and tin ore. Moreover, in remains of ancient bronze foundries, blocks of copper have been found which were, doubtless, used in making the alloy by the direct fusion of the two metals together. I could enter at greater length into the subject if necessary. Mr. W.'s views have, so far as my knowledge extends, nothing to stand upon. Yours very faithfully,

Sir John Lubbock, Bart., F.R.S. JOHN PERCY.

London, 23rd December.

DEAR SIR,

In answer to Sir John Lubbock's inquiry, I beg to say that I do not think bronze can ever have been produced for commercial purposes by fusing a mixture of copper ore and tin ore. I have not much doubt that this could be accomplished in the laboratory, but not, I think, in the usual mode of smelting on a large scale. Ores containing naturally both copper and tin are extremely unusual. Yours truly,

C. S. Grenfell, Esq. JOHN LEFEAUX.

Redruth, 11th Month, 14, 1868.

RESPECTED FRIEND,

I have received thy favour of the 12th inst., and in reply I beg to inform thee that I do not think there are any Cornish ores which can be so smelted as to produce a mixed metal consist-

ing only of copper and tin, and in such proportions as to form bronze ; and for this reason, that, although the ores may contain a sufficient proportion of tin, yet, as they also contain other metallic ingredients, it would, I think, be impossible to get rid of all such ingredients without at the same time getting rid of the tin also. I have, however, directed our assayer to make some experiments with reference to this subject.

I am, respectfully, thy friend,

ALFRED JENKIN.

C. Seymour Grenfell,
Copper Office,
27, Upper Thames Street, London, E.C.

In a subsequent letter, Mr. Jenkin states that the experiments made by the assayer confirmed him in the opinion above expressed.

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The passage from Avienus is as follows :—

Quæ Himilco Pœnus mensibus vix quatuor,
Ut ipse semet re probasse retulit
Enavigantem, posse transmitti adserit :
Sic nulla late flabra propellunt ratem,
Sic segnis humor æquoris pigri stupet.
Adjicit et illud, plurimum inter gurgites
Extare fucum, et sæpe virgulti vice
Retinere puppim dicit hic nihilominus
Non in profundum terga demitti maris,
Parvoque aquarum vix supertexti solum :
Obire semper huc et huc ponti feras,
Navigia lenta et languide repentia
Internatare belluas.

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Rougemont, in the L'Age du Bronze, concludes that, though tin was in ancient times obtained from Spain, the quantity was always inconsiderable. Don G. Schulz, the Director of the Spanish School of Mines, has, on the contrary, in his Descripcion Geognostica de Gallicia, expressed the opposite opinion. It is much to be wished that we had more information with reference to this interesting question.

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There are, indeed, one or two cases on record in which polished axes are asserted to have been found in gravel-beds. They rest, however, on the authority of uneducated labourers, whose attention would not be at the time directed to this point, and who would not appreciate its importance. Without then imputing to them any want of honesty, we may, I think, safely conclude either that these exceptional specimens were derived from interments, or that they had fallen in from the surface. In one or other of these ways I should account for the following case:—"In June, 1867, a labourer named Mercer, in the employment of the Messrs. Slater, of the Malton Nurseries, was digging gravel from the beds in question. At a depth of 9 feet, and below a band of undisturbed clay, he noticed a "dark-coloured stone" in the gravel. This was so firmly embedded (the gravel, though seemingly loose, is very firmly set), that he could not get it out without using the pickaxe. The shape and colour of the stone induced him to take care of it, but he washed off most of its incrustation of lime in a pool of water in a cart-rut. Much of the incrustation, however, still adheres (1869). After carrying the axe in his pocket for some days, he, at the end of the week, gave it to his masters for "a rockery ornament." Mr. M. B. Slater at once recognized it as being a small stone axe, and after showing it to several friends, eventually gave it to Mr. W. C. Copperthwaite, the Lodge, Malton, Earl Fitzwilliam's agent, in whose possession it now is (January, 1869)." Mr. Monkman himself, from whose paper I quote the above extract, considered that the axe was not really contemporaneous with the beds in which it was found*.

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Perhaps the lowest form of religion may be considered to be that presented by the Australians, which consists of a mere unreasoning belief in the existence of mysterious beings. The native who has a nightmare, or a dream, does not doubt the reality of that which passes, and as the beings by whom he is visited in his sleep are unseen by his friends and relations, he regards them as invisible.

* Monkman. Yorkshire Archæol. and Topogr. Journal. Jan. 1869.

In Fetichism this feeling is more methodized. The Negro endeavours to make a slave of his deity. Thus Fetichism is almost the opposite of Religion; it stands towards it in the same relation as Alchemy to Chemistry, or Astrology to Astronomy.

A further stage is that in which the superiority of the higher deities is more fully recognized. Every thing is worshipped indiscriminately—animals, plants, and even inanimate objects. In endeavouring to account for the worship of animals, we must remember that names are very frequently taken from them. The children and followers of a man called the Bear or the Lion would make that a tribal name. Hence the animal itself would be first respected, at last worshipped.

"The Totem," says Schoolcraft, "is a symbol of the name of the progenitor,—generally some quadruped, or bird, or other object in the animal kingdom, which stands, if we may so express it, as the surname of the family. Its significant importance is derived from the fact that individuals unhesitatingly trace their lineage from it." Totemism, however, is by no means confined to America, but occurs also in India, Africa, and in fact almost every where*, often in connexion with marriage prohibitions.

Mr. Fergusson has recently attempted to show the special prevalence of Tree and Serpent worship. He might, I believe, have made out as strong a case for many other objects. It must be remembered that the savage accounts for all action and movement by life; inanimate objects, therefore, have spirits as well as men; hence when the wives and slaves are slain, the weapons also are broken in the grave, so that the spirits of the latter, as well as of the former, may accompany their master to the other world.

The gradually increasing power of chiefs and priests led to Anthropomorphism and idolatry, which must by no means be regarded as the lowest stage of religion. Solomon†, indeed, long ago pointed out its connexion with Monarchical power.

It is important to observe that each stage of religion is superimposed on the preceding, and that bygone beliefs linger on among the children and the ignorant. Thus witchcraft is still believed in by the ignorant, and fairy tales flourish in the nursery.

* Trans. Ethnol. Soc. N.S. vol. vi. p. 36. Lafitau, Mœurs des Sauv. Amér. vol. i. p. 464.

† Wisd. xiv. 17.

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Degree of instruction of persons committed to the different County, Borough, and Liberty Prisons in England and Wales.

JUDICIAL STATISTICS—1870.

	Males.	Females.	
Neither read nor write	37,254	16,011	151,747
Read or write and read imperfectly	74,240	24,242	
Read and write well	4,286	661	5,198
Superior instruction	233	18	
	116,013	40,932	156,945
Instruction not ascertained . . .	227	51	278
Total	116,240	40,983	157,223

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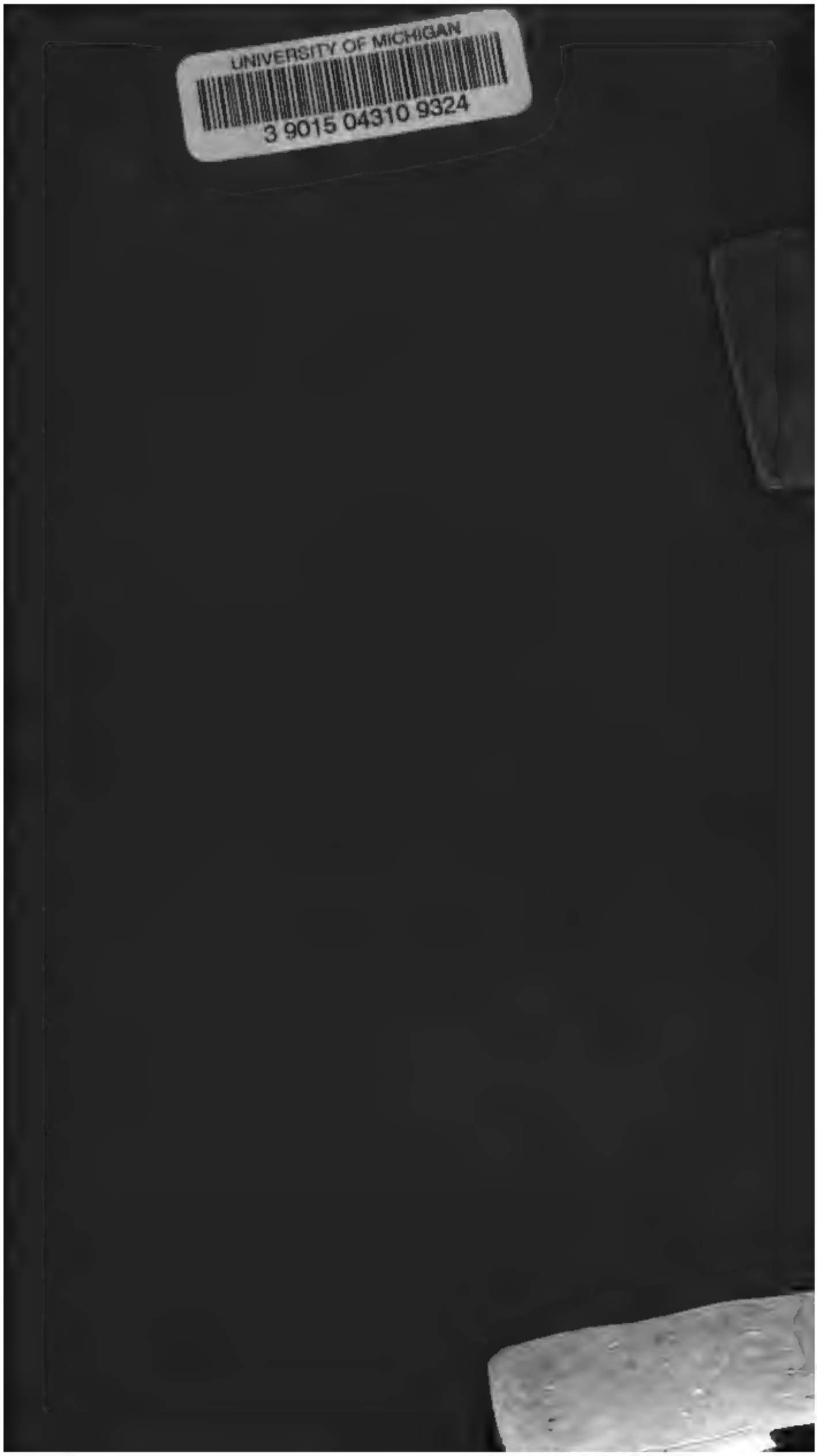
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